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NEW DRUGS IN THE TREATMENT OF MALARIA.

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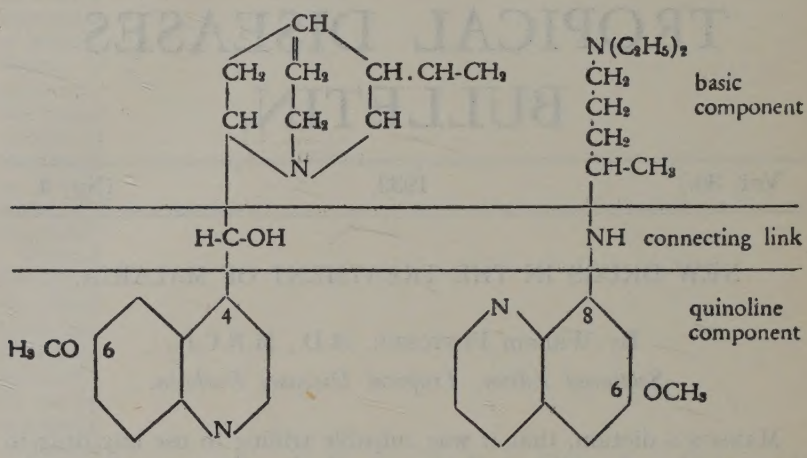
Manson's dictum, that it was culpable trifling to use any drug to the exclusion of quinine in the treatment of serious cases of malaria, remained true for many years in spite of the vaunted nostrums which were continually being put on the market. To-day, his words appear to need revision, and it seems opportune to make a compilation from the papers bearing upon the present position which have been summarized in this *Bulletin*. The figures in brackets which follow the names of authors are for the identification of the respective summaries; the first figure gives the year, the second in black face type gives the volume, and the third the page of the *Bulletin*. We propose to deal first with the synthetic drugs, because of their greater importance.

Plasmoquine.

Origin.

The shortage of quinine during the war led to experiments at Elberfeld with the object of finding a synthetic drug which could be used in its stead (Mühlens, 1932, **29**, 706). The only substances, other than quinine, which were found to have a definite effect in malaria were the arsenicals, such as salvarsan which acted on *P. vivax*, and methylene blue which acted on *P. malariae*. Schulemann and his colleagues (1932, **29**, 704) chose methylene blue for investigation; they prepared a large number of compounds which were tested by Roehl on canaries infected with *Plasmodium relictum*, and among these compounds they found one which was particularly effective; this was an aminoquinoline in which a basic aliphatic radicle was united to a quinoline nucleus by a connecting link of nitrogen. This substance was modified in many ways, and eventually the compound first known as beprochin, and afterwards as plasmoquine, was produced; its structural formula is given below. It proved to be more effective than quinine in the malaria of birds, and it was therefore selected for practical clinical investigation (Schulemann, Schönhöfer & Wingler, 1932, **29**, 353), with the result that Sioli and Mühlens (1927, **24**, 265 and 266) found that it was effective in benign tertian and quartan malaria; in

subtertian it had no therapeutic value because it had no action on the schizonts, but, in compensation, it possessed the remarkable and unique property of destroying the crescents.



$C_{20}H_{24}O_2N_2$
Mol. Weight 324

$C_{19}H_{29}ON_3$
Mol. Weight 315

'QUININE' **'PLASMOQUINE'**

The structural formulae of quinine and plasmoquine after SCHULEMANN (1932).

Action in Subtertian Malaria.

These conclusions were speedily confirmed by other workers in different parts of the world : not only did the drug destroy all forms of *P. vivax* and *P. malariae*, but it also possessed the singular property of destroying the gametocytes of *P. falciparum* in the peripheral blood. By itself it was useless in the treatment of subtertian malaria, because it had no action on the schizonts ; indeed it was found by several observers to have a provocative action (FISCHER & WEISE, 1928, **25**, 135 ; KLIGLER & REITLER, 1929, **26**, 922 ; HASSELMANN & HASSELMANN-KAHLERT, 1930, **27**, 208). It was, therefore, still necessary to treat this type of malaria with quinine, but plasmoquine was given at the same time in order to destroy the crescents, and so to prevent the patient from acting as a source of infection.

Action in Benign Tertian and Quartan Malaria.

The complete cure of benign tertian and quartan malaria is more often brought about by plasmoquine than by quinine (BAERMANN & SMITS, 1929, **26**, 372 ; MÜHLENS, 1930, **27**, 658 ; MORISHITA, 1931, **28**, 1009 ; SLATINEANU, BALTEANU & ALEXA, 1933, **30**, 62). JARVIS (1933, **30**, 81) treated 126 cases of benign tertian with 0·03 gram of plasmoquine and 20 grains of quinine daily, for 3 weeks, with only 6 relapses. PELTIER (1931, **28**, 975) treated a large number of benign tertian and quartan cases with quino-plasmoquine tablets, which consist of plasmoquine and quinine in the proportion of 1 to 30 as recommended by SCHULEMANN, with the result that only 4 per cent. of the benign

tertian cases relapsed, and none of the quartan. MORISHITA, MIYAHARA & ISHIOKA (1933, **30**, 81) have had a similar experience in the cure of quartan malaria ; they treated 11 cases with 0·04 gram of plasmoquine for 5 days, with complete cure in every case, while 2 controls treated with quinine both relapsed. SCHULEMANN (1933, **30**, 78) states that treatment with quino-plasmoquine has reduced the relapse rate of benign tertian to 3 per cent. as compared with 50 per cent. under quinine treatment, and that in quartan malaria no relapses have been recorded. This is not always the case as regards benign tertian, for there appear to be certain strains which are resistant to plasmoquine (SWELLENGREBEL & DE BUCK, 1933, **30**, 89), and in a recent report of the Malaria Commission in Holland (*ibid.*, 72) it was noted that while, in one district, only a single relapse occurred among 66 cases of benign tertian treated with 0·03 gram of plasmoquine and 15 grains of quinine, yet, in another district, the same treatment was followed by about 50 per cent. of relapses.

Prophylactic Action.

JAMES, NICOL, and SHUTE (1931, **28**, 973) have shown that plasmoquine acts as a prophylactic. Ten healthy volunteers were given a prophylactic dose of 0·06 gram of plasmoquine daily for six days, and, shortly after they had received the second dose, they were bitten by *A. maculipennis* heavily infected with benign tertian sporozoites. As the result of the plasmoquine, all the volunteers were protected ; none of them had a normal attack of malaria, but five of them sustained latent infections and had primary attacks seven to nine months later. JAMES (1933, **30**, 76) concludes that plasmoquine is a true prophylactic, but that the dose required for complete protection is too large to be safe. It is an even better protector against subtertian infection. SWELLENGREBEL & DE BUCK (1932, **29**, 357 ; 1933, **30**, 78) repeated JAMES's experiment, using a daily dose of 0·03 gram instead of 0·06 : but in this instance, all the volunteers went down with normal attacks, except one in whom the first attack occurred about 8 months later. SWELLENGREBEL considers that the exceptionally high vitality of the infecting strain of benign tertian which he employed, and the large number of mosquito bites inflicted, may be the explanation of the failure to protect in this experiment. RUSSELL (1932, **29**, 353) found that canaries under treatment with plasmoquine were protected against inoculation of *Plasmodium cathemerium*, but that this protective effect passed off within a few hours of stopping the drug.

Toxic Action.

The doses of plasmoquine which were given when it was first used, were far larger than those which are given to-day, and it was soon found to be much more toxic than had been supposed. As early as 1926, SIOLI (1927, **24**, 265) reported several cases of poisoning among his patients ; one to whom he had given 0·075 gram daily for eight days was seized with pains in the abdomen, and passed black urine ; his lips were livid and his blood was the colour of chocolate. Both urine and blood showed the spectrum of methaemoglobin.

Severe toxic symptoms sometimes arise with startling suddenness, but more often the onset is less abrupt ; cyanosis of the lips, or griping pains, are warning signs, and if the plasmoquine is stopped at once the symptoms soon pass off. If, on the contrary, it be continued, the cyanosis spreads to the palate, gums, and finger-nails, the temperature

rises, and an attack resembling blackwater fever develops, accompanied by destruction of red cells, haemolytic jaundice, and black urine containing methaemoglobin. Even when this stage has been reached, recovery may follow if the drug is stopped and injections of glucose and adrenalin are given (MANSON-BAHR, 1927, **24**, 741, and FREIMAN, 1929, **26**, 930). SINTON, SMITH & POTTINGER (1930, **27**, 656) report that severe toxic symptoms sometimes appear after treatment has been completed.

The examination of the liver in fatal cases shows hepatitis and fatty degeneration or necrosis (MANIFOLD, 1931, **28**, 1007 ; HASSELMANN & HASSELMANN-KAHLERT, 1930, **27**, 208 ; HULSHOFF, 1929, **26**, 373 ; BAERMANN & SMITS, 1927, **24**, 740), and it is probable that there is greater danger in cases where the liver has already been damaged by malaria but, apart from this, certain individuals are peculiarly sensitive to the drug. SINTON, SMITH & POTTINGER (1930, **27**, 656) have suggested that some batches of plasmoquine are more toxic than others, but the manfacturer's examination of a sample which they suspected did not confirm this.

The Dose.

Severe cases of poisoning are less common now that smaller doses are given. Six years ago, MÜHLENS (1927, **24**, 738) was giving as much as 0·18 gram a day, and daily doses up to 0·1 gram were frequently employed. CORDES (1928, **25**, 566) records two fatal cases, in which doses of 0·08 to 0·1 gram were given daily. BAERMANN and SMITS, reviewing the position for the year 1928, found that four deaths and eleven cases of severe intoxication had been reported.

Doses of 0·06 *gram.*—The dose recommended by SCHULEMANN & MEMMI in 1926 (1927, **24**, 739) was 0·06 gram a day ; but even with this dose, toxic symptoms occurred frequently. BROSIUS (1927, **26**, 15) reported that out of 60 cases treated by him with 0·06 gram daily, 10 had suffered from cyanosis, blackwater, or other symptoms of poisoning. With the same dose, DE BUEN (1929, **26**, 374) found it necessary to stop the treatment in 14 per cent. of his cases. NAMIKAWA (1929, **26**, 377) recorded that 9 out of 25 patients suffered from severe toxic symptoms ; SINTON, SMITH and POTTINGER (1930, **27**, 656) 11 out of 17 ; SQUIRES (1928, **25**, 567) had a similar experience ; HULSHOFF (1929, **26**, 373) reported a fatal case.

Doses of 0·04 *gram.*—Even with the smaller daily dose of 0·04 gram, together with 20 grains of quinine, SINTON and his colleagues (1930, **27**, 656) found that toxic symptoms appeared in 12 out of 48 men who were undergoing a continuous course of 21 days. MANIFOLD (1931, **28**, 1007) has reported on the results of the treatment of 3,187 soldiers by the same method ; among them there were two deaths and two serious cases of methaemoglobinuria, and he concluded that it was definitely unsafe to issue plasmoquine to patients who were not under medical supervision ; good results might be met with in 99 cases and disaster in the hundredth. Like opinions have been expressed by many workers, among whom are SINTON and BIRD (1929, **26**, 14), BAERMANN and SMITS (*ibid*, 372), NAMIKAWA (*ibid*, 377), KLIGLER and REITLER (*ibid*, 922), HASSELMANN & HASSELMANN-KAHLERT (1930, **27**, 208), SINTON, SMITH and POTTINGER (*ibid*, 656).

Doses of 0·03 *gram.*—Even with daily doses as small as 0·03 gram, FISCHER and WEISE (1928, **25**, 135) found methaemoglobin in 10 out of 13 patients, and PIEBENGA (1932, **29**, 710) who treated patients in

Holland with a daily dose of 0·03 gram of plasmoquine combined with 15 grains of quinine, over a period of 14 days, considered it necessary to exercise strict control. But, on the whole, it appears that this dose is reasonably safe, provided that it is given for a period of not longer than 6 or 7 days without a break. MACPHAIL (1931, **28**, 106) treated several thousands of people in Guatemala with a daily dose of 0·03 plasmoquine combined with 20 grains of quinine, over a period of 6 days, and toxic symptoms were observed in only one case.

Doses of 0·02 *gram.*—A daily dose of 0·02 gram of plasmoquine, together with 24 grains of quinine, is the standard treatment on the United Fruit Company's plantations; in places where more than 25 per cent. of the labourers are infected, this treatment is given to the whole population without any special supervision, and apparently with safety. The Company own many plantations where antimosquito measures are impracticable, and they rely on the discovery of all "positive" cases and their treatment with this six-day course of plasmoquine and quinine (DEEKS, 1931, **28**, 978; CONNOR, 1933, **30**, 61).

The Prevention of Mosquito Infection.

The real value of plasmoquine lies less in its power to cure—quinine and atebrin are less toxic—than in its power to prevent the spread of malaria. This is due to its unique effect upon the viability of the crescents which prevents their development in the mosquito host, and for this purpose very small doses are sufficient. MANSON-BAHR (1928, **25**, 564) showed that a single dose of 0·03 gram, though not large enough to destroy the crescents, was yet sufficient to prevent their exflagellation on a glass slide. BARBER, KOMP, and NEWMAN (1929, **26**, 939) administered 0·04, 0·015, and 0·005 gram respectively, to three cases of subtertian malaria whom they had proved to be good infectors of mosquitoes. These doses did not reduce the number of crescents in the blood, but they rendered the patients non-infective to mosquitoes for several days, and BARBER concluded that "amounts of plasmoquine within the limits of safety are effective against gametocytes, and may be combined with quinine (and caution) in the treatment of populations." This work was confirmed by WHITMORE (1931, **28**, 107) who found that a dose of 0·02 gram, or about 0·00033 gram per kilo of body-weight, was sufficient to render a patient non-infective to mosquitoes; SUR, SARKAR & BANERJI (1933, **30**, 85) and others have had similar results. AMIES (1931, **28**, 599) states that 0·04 gram, given in two doses of 0·02 gram, sixteen hours apart, renders crescent-carriers non-infective for at least three days, and that if the dose is repeated every fourth day they remain so.

The mass treatment of labour forces on these lines, with small doses of plasmoquine, has been employed in many places as an antimalaria measure, but the success of the method depends upon the extent to which the group is under control, and SCHULEMANN (1932, **29**, 704) has recently expressed the opinion that antimosquito measures will still be necessary, for though plasmoquine will render a gametocyte-carrier incapable of infecting mosquitoes, it will rarely be possible to treat every carrier in a district. CLEMESHA and MOORE (1931, **28**, 576), have reported the remarkable success of the method, combined with anti-larval measures, on an isolated tea-estate in Travancore: but they point out that their labour force was under complete disciplinary control, and they consider that anti-gametocyte treatment would be hopeless with an ordinary civil population. BARBER and his colleagues

(1932, **29**, 686) obtained success with 0·01 gram of plasmoquine administered twice a week to groups of labourers in Liberia, but within fourteen days of stopping it, the infection rate of the local anophelines rose rapidly, and they concluded that " the group to be treated should be more or less isolated from non-treated groups, and should be amenable to treatment." DE MELLO and BRAS DE SA (1932, **29**, 359) successfully treated the population of an isolated village, but an influx of labourers from malarious districts undid their work. KLIGLER and MER (1931, **28**, 599) treated the inhabitants of five villages in Palestine, and thereby materially reduced the percentage of human and mosquito infection, but within two weeks of stopping the treatment its good effects had disappeared, and they concluded that " mass treatment in an infected region, at a time when infected mosquitoes are already about, is entirely ineffectual in so far as checking or controlling the disease is concerned."

KINGSBURY and AMIES (1932, **29**, 359) gave 0·04 gram twice weekly to 330 labourers on a rubber estate, for a period of 12 months. The sickness rate was reduced by 50 per cent., and no crescent carriers could be found at the end of the experiment, but there was only a slight improvement in the splenic index, and the parasite-rate was not reduced to a greater degree than on the control areas.

It is, unfortunately, impossible to control the administration of plasmoquine (as it is possible to control the administration of quinine) by the application of a simple test to small samples of urine. The quantity of plasmoquine is so small that, in order to detect it by SCHULEMANN's chloranil test (1928, **25**, 568) it is necessary to collect several hundred cubic centimetres, over a period of several hours, and extract with ether. Plasmoquine is present during the first eight hour period, but not later (GREEN, 1930, **27**, 654).

Atebrin.

Origin and Tests on Birds and Men.

The work of SCHULEMANN and his colleagues at Elberfeld, which culminated in the synthesis of plasmoquine, was continued by MIETZSCH and MAUS ; more than 12,000 compounds were evolved and eventually the drug now known as atebrin was produced ; it was first called erion or plasmoquine E. It is the dihydrochloride of an alkylamino-alkylamino-acridin derivative; a yellow powder with a bitter taste, soluble to 7 per cent. in water at 40°C. and, like quinine, fluorescent under ultraviolet radiation. KIKUTH (1932, **29**, 705) found, as the result of tests made with *Plasmodium praecox* and *Haemoproteus orizivorae* infections of birds, that it destroyed the schizonts, but differed from plasmoquine in not being a gametocide. If rice-birds infected with *H. orizivorae* were treated with plasmoquine, the gametocytes were destroyed, but, when the drug was stopped, they appeared again, having developed from the schizonts in the endothelial cells, which had been unaffected by the plasmoquine. When atebrin was given in addition to plasmoquine, these schizonts were destroyed and relapses occurred no more, or only after a long interval (SCHULEMANN, 1933, **30**, 78). Tests in therapeutic and naturally occurring malaria, made by SIOLI, PETER, and MÜHLENS (1932, **29**, 705–6), showed a similar action in man ; its effect on human malaria resembled

that of quinine, for it destroyed all forms of benign tertian and quartan parasites, and also the schizonts of malignant tertian, but it left the crescents untouched.

Dose.

The usual dose of atebrin is 0·1 gram, three times a day; and, in subtertian malaria, 0·01 gram of plasmoquine is generally given with it in order to destroy the crescents. Many of the United Fruit Company's officers have found it equally effective, and more convenient, to give the daily amount of 0·3 gram in a single dose instead of dividing it into three (1933, **30**, 61). GREEN (1932, **29**, 707) found 0·2 gram a day too little, and 0·4 gram a day too much; he considers the optimum daily dose to be about 0·1 gram per 18 kilogram body-weight, given for six or seven days. As regards the length of the course, MÜHLENS & FISCHER (1932, **29**, 706) recommend seven to ten days, but JAMES, NICOL & SHUTE (1932, **29**, 695), HOOPS, (*Trans. Roy. Soc. Trop. Med. & Hyg.*, 1932, **26**, 289–294), and others have had excellent results with a course lasting only five, which would mean a considerable reduction in the cost, where there were large numbers to be treated.

Toxic Action.

The toxicity of atebrin is low: SIOLI (1932, **29**, 705) found that double the usual daily dose of 0·3 gram was well tolerated, but that larger doses caused gastro-intestinal symptoms. Three out of 50 patients treated by GREEN (1932, **29**, 707) suffered from severe pain in the abdomen which appeared on about the fifth day of treatment and lasted for a week. THONNARD-NEUMANN (1932, **29**, 708) and DRENOWSKI (1932, **29**, 709) have also noted the occurrence of abdominal pain, but were inclined to attribute it to plasmoquine which was being given in addition. DE MELLO and his colleagues (1933, **30**, 79) have found fatty degeneration in the livers and kidneys of rabbits and cats poisoned with large doses of atebrin. A yellow staining of the skin and conjunctiva appears occasionally in patients who are under treatment, but this is quite distinct from any toxic action, and is due to the staining properties of the drug. GREEN (1932, **29**, 707) has found that it is especially likely to occur in cases where excretion of the drug is so long delayed that none appears in the urine earlier than the fourth day. The yellow staining may last for as long as two or three weeks (SIOLI, 1932, **29**, 705).

Persistence in the Body.

Quinine disappears quickly, but atebrin remains in the body for a long time: GREEN (1932, **29**, 707) found it in the urine for eight or nine days after the conclusion of a seven-day course; JARVIS (1933, **30**, 81) examined the urine of five patients, also after a seven-day course, and found that it was present for an average period of 26 days, in one instance it persisted for 37 days; NEUMANN and LE DOUX, of the United Fruit Company (1933, **30**, 61) have found it present 36 days after the last dose. It is a simple matter to detect atebrin in the urine. GREEN (1932, **29**, 707) recommends, for routine work, adding sulphuric acid and heating, which in the presence of atebrin gives a characteristic yellow colour, best seen by looking down the test tube from above. In the more delicate test recommended by the manufacturers, the alkalinized urine is extracted with ether, this extract is then evaporated and the residue is dissolved in strong sulphuric acid, forming a yellow, highly fluorescent solution.

Possible Prophylactic Action.

It has been suggested that its property of persisting in the body may render atebrin a useful prophylactic, and NAPIER AND GUPTA (1932, **29**, 707) have brought forward some evidence in support of this.

No Action on the Viability of Crescents.

Atebrin does not affect the viability of crescents; GREEN (1932, **29**, 707) successfully infected anopheles of several species by feeding them on patients at the end of a seven-day course of treatment.

Prevention of Relapses.

A most valuable property of atebrin is the power to prevent relapses which it appears to possess to an extent unknown in any other drug. GREEN (1932, **29**, 707) treated 21 cases with no relapses, while there were 13 relapses among 34 controls treated with quinine. JAMES and his colleagues (1932, **29**, 695) treated 15 cases with 0·3 gram daily for five days, and in only one did it fail to effect a permanent cure; four of them were chronic relapsing cases who had already taken several courses of quinine treatment, and two had had blackwater fever. Five cases, infected at Horton with the malignant "Rome" strain of *P. falciparum*, had no relapses after a five-day course of atebrin, but two controls who were treated with quinine continued to relapse frequently. SIOLI (1932, **29**, 705), THONNARD-NEUMANN (1932, **29**, 708), HOOPS (*Trans. Roy. Soc. Trop. Med. & Hyg.*, 1932, **26**, 289–294), DE MELLO, BRAS DE SA & DE AZEVEDO (1933, **30**, 79), JARVIS (1933, **30**, 81), and others, have had similar experience.

In the Field.

Atebrin has been used with success in the treatment of agricultural labourers in the tropics by the officers of the United Fruit Company in the West Indies, and by HOOPS in Malacca. It is easy to take and has none of the unpleasant attributes of quinine—the bitter taste in the mouth, the tinnitus and deafness. According to GREEN (1932, **29**, 707) the general condition as regards haemoglobin, size of spleen, weight and so on, improves under atebrin treatment as with quinine. A great advantage of atebrin is that a short course of five days treatment appears to be at least as efficient as a long course of quinine. At present, it is expensive; but, according to HOOPS (*Trans. Roy. Soc. Trop. Med. & Hyg.*, 1932, **26**, 289–294) the quantity required for a five-day course costs less than an ounce of quinine. Above all, it appears that atebrin offers a greater prospect of complete cure than any other known drug.

Fourneau 710.

Fourneau 710, a yellow powder soluble in water, is a quinoline derivative, which, according to MARCHOUX (1932, **29**, 348) is N-diethylaminopropyl-8-amino-6-methoxy-quinoline. (Plasmoquine is N-diethylamino-isopentyl-8-amino-6-methoxy-quinoline. See 1931, **28**, 1011.)

FOURNEAU and his colleagues concluded from its action on *Haemoproteus orizivorae* of birds that it could be employed in place of plasmoquine. SERGENT (1931, **28**, 1013) showed that its action on *Plasmodium relictum* in canaries equalled that of quinine. MONIER (1931, **28**, 1012) found that it destroyed the parasites of benign tertian malaria, but had

no action in subtertian. He concluded that the maximum single dose was 0·02 gram, and that 0·06 to 0·08 gram, in one day, was the optimum amount: larger doses were followed by toxic symptoms. The brothers SERGENT with their colleagues (1933, **30**, 84) treated 20 cases of subtertian malaria with similar doses, but the results were unsatisfactory: it had no effect on the schizonts, and many of the patients suffered from pains in the abdomen, vomiting, or other symptoms of intolerance. SAUTET (*Bull. Soc. Path. Exot.*, 1932, **25**, 1074–91) has concluded, as the result of his investigations in Corsica, that 710, given alone, has little or no effect upon the parasites of malaria, but when it is combined with quiniostovarsol it is effective in all three forms, and rapidly destroys the gametocytes of *P. falciparum*. He recommends two seven day courses consisting of 0·02 gram of 710 and 0·25 gram of quiniostovarsol four times a day, with an interval of five days between the two courses. Some batches of the drug used by him were more toxic than others. SAUTET has also employed another quinoline derivative prepared in Professor Fourneau's laboratory, and known as 574, but the results, so far, have been inferior to those obtained with 710.

The Arsenicals.

The arsenicals, especially *Stovarsol*, are used to a large extent in the French colonies, and are said to be of great value in the treatment of chronic, cachectic cases of malaria. They are active against the benign tertian parasite only, and therefore stovarsol is usually prescribed as *Quiniostovarsol*, which consists of stovarsol with an equal quantity of quinine.

All forms of benign tertian parasites disappear rapidly when stovarsol is given, but the majority relapse. (CIUCA & ALEXA, 1929, **26**, 24; SINTON, BIRD & EATE, 1929, **26**, 379; DE LA CAMARA & MORALEDA, 1931, **28**, 1011) TARDRES (1927, **24**, 742) and SINTON (1928, **25**, 140) have found it inferior to quinine in reducing enlarged spleens. The first injection is often followed by high fever, and CIUCA and ALEXA (1929, **26**, 24) have reported the occurrence of nephritis, with blood and casts in the urine, in 9 out of 20 cases treated. LARGE and BONAVIA (1927, **24**, 270) state that patients treated with stovarsol, soamin or kharsulphan together with quinine do no better than those treated with quinine alone. MORISHITA and NAMIKAWA (1931, **28**, 1010) have reported on the use of *Osvarsan*, an oral antisyphilitic drug made in Japan, with the same constitution as stovarsol. They found it effective in benign tertian malaria, but it did not prevent relapses, nor had it any action upon subtertian or quartan parasites.

Drugs Containing Quinine.

From time to time, proprietary remedies appear which owe their specific action wholly, or in part, to the quinine which they contain. The well-known *Esanofele* consists of quinine, arsenic, iron, and bitter herbs. A new preparation has been put on the market recently, under the name of *Tebetren*. The makers describe it as "combining acridine and quinine derivatives with a derivative of cholic acid." STOUTE (1933, **30**, 84) has reported the successful treatment of 100 cases with it: but the side effects, such as deafness and tinnitus, resembled those of

cinchonism, and it is difficult to judge to what extent such preparations differ from simple quinine in their action upon the parasites of malaria.

The Annual Report of the Institute for Medical Research, Federated Malay States, for the year 1931, contains a report on *Malarcan*, according to which it appears to be a proprietary preparation of the same nature as Tebetren, but containing quinidine in place of quinine. "Twelve tablets of malarcan were found to alleviate symptoms and to destroy parasites as effectively as quinine in a dosage of 30 grains. . . . The effect on the gametocytes of *P. falciparum* was, however, negligible and, in view of the fact that the cost of malarcan is approximately six times that of quinine, it is unlikely that its use will become general."

Totaquina is not a proprietary drug, but a preparation of the total alkaloids of cinchona standardized to contain 70 per cent. of crystallizable alkaloids, including 15 per cent. of quinine (1932, **29**, 461). It is not a new drug, but a new name for a standardized cinchona febrifuge, the preparation of which was recommended by the Malaria Commission of the League of Nations with the view of finding a cheaper drug for the treatment of malaria. In order to provide the alkaloids in sufficient quantity, it would be necessary to extend the planting of cinchona, and it was suggested that the hardy *Cinchona rubra* should be grown over wide areas in tropical malarious countries. HENRY (1933, **30**, 77) and others consider that the revival of cinchona planting in the British tropics would merely renew the old trouble of over-production, and, in the long run, would benefit nobody. In addition, they point out that the introduction of synthetic antimalarial drugs may seriously interfere with the demand for the cinchona alkaloids, and that the present is no time to undertake an extension of planting.

HELMINTHIASIS.

MAPLESTONE (P. A.). **The Testing of Anthelminthics.**—*Indian Med. Gaz.* 1932. Dec. Vol. 67. No. 12. pp. 673–674.

The accompanying table represents those percentages of fertile eggs displayed respectively by D.C.F. and by Stoll's counting technique in a large number (certainly more than 3,395) of stools of inhabitants of Assam and Bengal, a single examination being made by each method.

TABLE II.

	Per cent. positive to Lane, positive to Stoll.	Per cent. positive to Lane, negative to Stoll.	Per cent. negative to Lane, positive to Stoll.
Ascaris	91·4	8·12	0·64
Hookworm ...	74·19	25·38	0·43
Trichuris ...	44·89	54·01	1·10
Trichostrongylus	22·63	77·37	0·00

"From the above discussion it seems clear that many cases of light helminth infection, such as will be found after treatment by an efficient anthelminthic will be missed by Stoll's technique and discovered by Lane's centrifuge, and that, although Stoll's technique is of undoubted use as a means of diagnosis in cases passing large numbers of eggs, it is not very reliable when the eggs are few, and it may thus give a false impression of the value of an anthelmintic."

The paper shows, too, how important cleanliness is if proper results are to be obtained by D.C.F. *Clayton Lane.*

HALL (Maurice C.). **Specific Anthelmintic Medication.**—*Puerto Rico Jl. of Public Health & Trop. Med.* 1932. Sept. Vol. 8. No. 1. pp. 35–50. [Spanish version pp. 51–68.]

Various drugs are considered under the headings of dosage, purgative, other measures, action of drug, contraindications. There are discussed for ascaris—oil of chenopodium, santonin and hexylresorcinol; for hookworms—carbon tetrachloride, tetrachlorethylene and chenopodium; for ascaris and hookworms—chenopodium with carbon tetrachloride or tetrachlorethylene; for whipworms—leche de higuerón and santonin; for threadworms—tetrachlorethylene; for strongyloides—gentian violet and chenopodium; for schistosomes—tartar emetic. There are also considered tapeworms adult and larval, trichinella, filariids, fasciolopsis, clonorchis, fasciola and paragonimus. Thymol has no place in the armamentarium. *C. L.*

LAMSON (Paul D.), BROWN (Harold W.) & WARD (Charlotte B.). **Anthelmintics: Some Therapeutic and Practical Considerations on their Use.**—*Jl. Amer. Med. Assoc.* 1932. July 23. Vol. 99. No. 4. pp. 292–295. [29 refs.]

"If one still retains one's faith in the older remedies, thymol, santonin, betanaphthol, oil of chenopodium, its active principle, ascaridole, or carbon

tetrachloride, one is bound to run a certain risk of death, a fair chance of collapse, an acute nephritis from betanaphthol, disturbance of vision with santonin, deafness from oil of chenopodium and necrosis of the liver from carbon tetrachloride."

"Although the death rate may be only 1 : 40,000 from any of these drugs, the deaths are pathognomonic of each substance, and are not due to extraneous factors. . . Hexylresorcinol is the first anthelmintic that we know of which, for any reason, has been given with the object of absorption from the intestinal tract."

[About 14 years ago (this *Bulletin*, Vol. 17, p. 75) CAIUS and MHASKAR showed that when thymol was adequately particulated all was absorbed from the intestine ; those who have given it since that date have surely done so with the intention that it should be so absorbed. It is noteworthy that Lamson and his colleagues give no specific indication of the kind of death pathognomonic of thymol. The reviewer has been equally unsuccessful in a survey of all deaths whose descriptions he could collect and has concluded "since the lesions described differ in every case, except that of the two brothers who died together, they cannot reasonably be attributed to thymol."] Regarding hexylresorcinol [this *Bulletin*, Vol. 29, p. 56] the authors write here,

"Having lately introduced a new anthelmintic ourselves, we are in the early period of enthusiasm in which we hope to find that it will prove to be of value, but already unexpected complications have arisen and it remains to be seen whether this substance will survive as well as its predecessors. . . . Sharpe and Dohme, who control this substance, have been so bothered by complaints of children chewing up the pills [and obtaining extensive though superficial burns of the mouth] that we understand that hexylresorcinol has been withdrawn from the general market although it is still supplied to health boards." *C. L.*

BROWN (H. W.). **The Treatment of Ascariasis and Trichuriasis with Hexylresorcinol Pills.**—*Amer. Jl. Hyg.* 1932. Sept. Vol. 16. No. 2. pp. 602–608. With 5 graphs.

"On account of hexylresorcinol reacting with gelatin its administration in hard gelatin capsules has been found impractical particularly in hot moist regions where parasitic worms are most prevalent. Sugar-coated pills of crystalline hexylresorcinol have been made to overcome this difficulty. They are, when kept in bottles, unaffected by climatic conditions. These pills each containing 0·2 gram of the drug have been administered to 650 patients to ascertain their effectiveness as compared to hexylresorcinol in hard gelatin capsules against ascaris and trichuris. The dosage of 0·1 gram per year of age up to 10 years and 1·0 gram to everyone above this age was used. They were treated early in the morning on an empty stomach and were allowed no food for 4 to 5 hours afterwards. An average reduction of 90 per cent. ascaris and 32 per cent. trichuris was obtained with the above doses. Two doses of hexylresorcinol three weeks apart reduced the ascaris egg count 96 per cent. and made 93 per cent. of the subjects entirely free of this parasite.

"In young children with unusually heavy infestations of ascaris it is very difficult to remove all the worms with a single treatment using the scale of dosage outlined. In these cases one can give them an extra pill (0·2 gram hexylresorcinol) or repeat the standard dose two weeks later if their stools still contained ascaris eggs.

"With the exception of local irritation in the mouth in one or two children who chewed up the pills, and an occasional case of slight epigastric discomfort and vomiting, no toxic manifestations occurred. As pointed out in our previous publications hexylresorcinol precipitates proteins, and

if the crystals come in contact with the mucous membranes of the mouth a superficial "burn" will occur. This is however never deep. On account of the whitening of the mouth and possible desquamation of epithelium the appearance may be alarming. None of these children who chewed up pills paid any attention to this occurrence on account of the local anaesthetic effect of the drug and willingly returned for a second treatment three to four weeks later. It is certain that many complaints will be made on account of the improper administration of this drug. We feel however that this is in no way a contra-indication to its use as an anthelmintic."

Lack of discipline in feeding nullifies results. The most striking example of this cited by Brown is that of a family of 8 in which after treatment there was no reduction of eggs in counts made by Stoll's method. They "later admitted eating and when treated correctly a second time passed over 90 per cent. of their worms." *C. L.*

AZIM (M. Abdel). **Investigations on the Anthelmintic Power of Hexylresorcinol.**—*Jl. Egyptian Med. Assoc.* 1932. Sept. Vol. 15. No. 9. pp. 635–637.

The drug was given in chocolate-coated pills on an empty stomach in the morning in dosage of 1·4 gm. for an adult and 0·8 to 1·2 gm. for children under 12. Egg counts were made by Stoll's method and there was a considerable discrepancy, which could not be explained, between the number of ova and the worms passed. For *A. duodenale* the drug proved very unsatisfactory; of 26 cases one showed no ova afterwards, the rest showed as many eggs as before or at most a slight diminution in their number. For ascaris, enterobius and trichuris the results were better; when it was given for heterophyes to dogs, the flukes were numerous and in good condition when the hosts were killed later.

C. L.

MAPLESTONE (P. A.) & MUKERJI (A. K.). **Hexylresorcinol as an Anthelmintic.**—*Indian Med. Gaz.* 1932. Nov. Vol. 67. No. 11. pp. 610–612.

Hexylresorcinol, 1 gm., was given in hard gelatin capsules in hospital under strict fasting. In 21 ascaris cases there was an egg reduction by Stoll's original counting method of 94 per cent. and a cure rate of 66·6 per cent. For hookworms the figures were 71·4 and 7·7 only, cure being determined by D.C.F. used at least 10 days after treatment. The latter method they consider much the more valuable of the two in view of the severe poisoning to which the worms have been subjected, and the resultant interference with oviposition. No head was recovered in 10 cases of *Taenia saginata* infection but 5 reported no recurrence over 3 months later. The drug costs 30 shillings an ounce in India. *C. L.*

WRIGHT (Willard H.) & SCHAFFER (Jacob M.). **Critical Anthelmintic Tests of Chlorinated Alkyl Hydrocarbons and a Correlation between the Anthelmintic Efficacy, Chemical Structure and Physical Properties.**—*Amer. Jl. Hyg.* 1932. Sept. Vol. 16. No. 2. pp. 325–428. With 2 figs. [55 refs.]

In the writer's conclusions to this long and detailed paper the sentences which are believed to be most important for medical men seem to be the following :—

"Critical anthelmintic tests for intestinal parasites of the dog have been carried out with the following chlorinated alkyl hydrocarbons: N-propyl chloride, n-butyl chloride, n-amyl chloride, n-hexyl chloride, 2-chlorbutane, 2-chlorpentane, 3-chlorpentane, tertiary amyl chloride, ethylidene chloride, n-butylidene chloride, propylene chloride, trimethylene chloride, amylene dichlorides, 1-2-3 trichlorpropane, trichlorethane, s-tetrachlorethane, pentachlorethane and trichlorethylene."

"Gross pathological alterations of varying intensity in the gastro-intestinal tract, the liver and the kidneys of the treated dogs were associated with nearly all of the compounds used in the present tests."

"Histological changes in the livers of treated dogs were associated with nearly all compounds tested. Histological changes in the kidneys were apparently associated with the administration of some of the compounds."

"The data presented in this paper warrant the conclusion that anthelmintic efficacy of chlorinated alkyl hydrocarbons against *A. caninum* is intimately linked with water solubility which varies with the chemical structure of the molecule and that the anthelmintic efficacy is not solely dependent on the halogen concentration or on the position of the chlorine atom or atoms in the molecule. With a single exception those compounds having water solubilities between 1 : 1,250 and 1 : 5,300 showed a high degree of anthelmintic efficacy for hookworms in the dog regardless of the halogen concentration or the position of the chlorine atom or atoms in the molecule. Water solubility is, therefore, the factor most definitely correlated with the anthelmintic efficacy of chlorinated alkyl hydrocarbons for hookworms." *C. L.*

DE RIVAS (Damaso). **Intestinal Parasitism. Diagnosis and Treatment.**—*Amer. Jl. Trop. Med.* 1932. Nov. Vol. 12. No. 6. pp. 477–492. With 4 figs.

The method of diagnosis is a modified Telemann technique. The customary striking microphotographs which illustrate most claims for excellency in the working of a concentrative technique are forthcoming. Treatment was by intraduodenal or rectal lavage according as to the parasites' estimated nearness to one or other end of the alimentary canal, the temperature of the fluid being 45°C. to 47°C. For the front end of the gut there is preliminary injection of 1 to 2 oz. of equal parts of glycerine and 30 per cent. magnesium sulphate, and the fluid is normal saline; for the hinder end a copper sulphate solution, 1 in 5,000, is used [see this *Bulletin*, Vol. 27, p. 160]. *C. L.*

ALEXEIEFF (Georges). Sur l'hématopoièse dans les helminthiases. Sur la question de l'origine des éosinophiles. [**Blood Formation in Helminth Infections.**]—*C. R. Soc. Biol.* 1932. Oct. 28. Vol. 111. No. 32. pp. 355–358.

The bone marrow was investigated by puncture with a trocar, under a local anaesthetic in adults, in 16 cases of eosinophilia, 12 being infected with helminths (*Taenia saginata* 7, *Fasciola hepatica* 3, *A. duodenale* 1, hydatid of liver 1) and 4 not, though one of the last had amoebiasis. In 13 the medullary type was neutrophil normoblastic, in 2 youths infected with taenia there was predominance of myelocytes and neutrophil promyelocytes, while in one with grave hookworm anaemia erythroblasts and young myelocytes and promyelocytes predominated. Excess of eosinophils or of young forms was always present where there was a blood eosinophilia and sometimes when there was not. Conversely in kala azar with disappearance of eosinophils in the blood they

disappeared from the marrow, and when, after treatment, they reappeared in the blood they reappeared in the marrow also. By a stop on the canula too deep a perforation of the sternum was prevented.

C. L.

JOURNAL OF PARASITOLOGY. 1932. Dec. Vol. 19. No. 2. pp. 151–182.—**Program and Abstracts of the Eighth Annual Meeting of the American Society of Parasitologists, Atlantic City, New Jersey, December 28, 29 and 30, 1932.**

Mary Scott SKINNER's examinations make *Diphyllobothrium cordiceps* of gull and pelican a synonym of *D. latum.*

Marcos A. TUBANGUI found first intermediate hosts of *Euparyphium ilocanum* in *Planorbis compressus* and *P. umbilicalis.* Metacercariae encyst in the walls of the mantle cavity of these snails and of *Bulinus hungerfordianus* and *Lymnaea peregra.* Cysts fed to clean rats developed into the adult. The habit of eating raw or rawish snails prevails where the fluke is common in man.

On morphological grounds it is contended by J. H. SANDGROUND. that no distinction can be drawn between *Onchocerca volvulus, O. caecutiens, O. gibsoni* and several presumptive bovine species.

Microfilaria ozzardi has been found by O. R. McCOY in the blood of 44·5 per cent. of 119 Indians in the Tuira River basin, Darien Province, Panama. *C. L.*

BRITISH MUSEUM (NATURAL HISTORY). **Instructions for Collectors. No. 12.—Worms.**—22 pp. With 19 figs. 1932. London. [6d.]

The instructions include descriptions, sufficient for general recognition, of the main groups of worms, where to look for them, how to collect, preserve, label and pack them for transport, together with a list of the necessary equipment. These instructions are clear and excellent, as are the figures which illustrate them. *C. L.*

HUMPHREYS (R. M.). **Vesical Schistosomiasis in the Gezira Irrigated Area of the Sudan.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. Nov. 30. Vol. 26. No. 3. pp. 241–252.

Irrigation from the Sennar dam across the Blue Nile was begun, in 1925, of 490 sq. miles of the low lying flat Gezira Province, situated between the Blue and the White Nile. Before this time schistosomiasis was almost absent. Bilharzia-carrying molluscs first appeared in the irrigation canals 18 months after their opening, but by another year were present in all of them ; they breed in this latitude throughout the year. But these snails appeared also in pools 20 miles from the river and 30 miles from any canal, brought there it is believed when young on the legs of ducks and wading birds. Moreover the Sudan is entered yearly by some 25,000 persons and 8 to 24 per cent. of them were found at the quarantine stations on the White Nile and at Wadi Halfa to be infected with vesical schistosomiasis.

The measures taken to prevent the spread of schistosomiasis were : (1) Elimination of the human carrier by urinary examination and treatment with tartar emetic of all immigrants, continued till eggs were no longer viable. The immigrants from the west were of two sorts : young males from Western and French Sudan earning money to buy a

wife—useful but roving labour ; leisurely pilgrims working their way from British West Africa to Mecca and back again. The effectiveness of the quarantine stations is shown by the following figures : In 1926–7, 14·6 per cent. of immigrants examined in the Gezira area itself were infested, and 2 years later the percentage was 1 only. (2) Prevention of contamination of canals by official prohibition aided by two pamphlets, one illustrating acquisition of the disease, the other a religious decree by the Grand Mufti in the Sudan forbidding fouling of the canals. (3) Destruction of the molluscs in the canals, $\frac{1}{5}$ of the total length of these being completely dried and re-excavated yearly, and the rest, still holding water, so treated with sizolin, a commercial carbolic acid, that its strength in them was 1 in 20,000. No *Bullinus* or *Planorbis* species has been found to survive this procedure. (4) Trapping of snails was too tedious. (5) Ducks were too tempting prizes to wandering cotton pickers to allow of their general use. In spite of the abundant introduction by irrigation of host snails these measures proved most effective ; for three surveys of 12,000 to 15,000 persons yearly showed a fall of percentage of infection in local natives from 0·3 to 0·07 for men and 1 to 0·6 in children, and in non-local men from 4·3 to 0·7. *C. L.*

DAY (H. B.). **Bilharzial Cirrhosis. (Egyptian Splenomegaly.)**—*Jl. Trop. Med. & Hyg.* 1933. Jan. 16. Vol. 36. No. 2. pp. 17–23. With 4 figs. [14 refs.]

The clinical and pathological features of this affection closely resemble those of Katayama disease caused by *S. japonicum.* The main lesions of schistosomiasis are set up by the ova, and in solid viscera (liver and pancreas) the eggs cannot escape and finally induce fibrosis. With few eggs, repair balances damage and function is unimpaired ; with more of them, a multilobular cirrhosis ensues ; with many worms and many ova, periportal pipe-stem cirrhosis is produced. There is a preponderance of lateral-spined over terminal-spined eggs of 4 to 1 as found by FERGUSON. The liver shrinks and ascites appears. The splenomegaly is dependent on venous stagnation, is not proportional to hepatic enlargement and may be influenced by involvement of the splenic vein, particularly in that part of its course where it is embedded in the pancreas, for this organ is frequently infected with worms and ova. Symptoms are considered, particularly the hepatosplenic syndrome, as is diagnosis. Treatment by antimony should be preceded by removal of complicating conditions such as hookworm infection, malaria, and pellagra, supplemented by splenectomy when splenomegaly is gross and long-standing. *C. L.*

GOPSILL (L. W.). **Observations on Schistosomiasis in the Lower Shire District.**—*Nyasaland Protectorate Ann. Med. Rep. on Health & San. Conditions for Year ending 31st December, 1931.* Appendix II. pp. 1–3.

The urine was found heavily infected with eggs of *S. haematobium* in 400 of 500 persons who had no urinary symptoms at all. The snail implicated is *Melanoides tuberculata* which was present in thousands in the muddy but not the sandy parts of the river. It was found in mud 5 feet below the dried river bed. Infected snails disappeared when the river rose or fell suddenly as well as when it was at its lowest level. This species has never been found to harbour cercariae when its young

are developing nor does it retain these parasites for more than 14 days. It harbours 5 types of fork-tailed cercariae of which two seem to be those of *S. haematobium* and *S. mansoni* ; no *Planorbis* has been found ; and, although these cercariae have failed to infect monkeys and rats, yet " the evidence of the bathing places, and of the high degree of infection amongst bathers in the *M. tuberculata*-infected waters, and the fact that the natives who bathe only in *tuberculata*-free waters remain free from infection, speaks for itself." Eggs of *S. mansoni* were usually found only after prolonged search, but in those who had a history of the passage of bright red blood followed by abdominal pain and dysentery, such prolonged search showed infection in 98 per cent. This history together with a curious bluish tinge to the conjunctiva is held to be definite evidence of that infection, so that a negative stool should be looked on with suspicion. Fouadin in treatment gave good results. *C. L.*

VIALATTE (Ch.). La bilharziose vésicale au Maroc. Le foyer d'Erfoud. [**Endemic Focus of Urinary Schistosomiasis at Erfoud (Morocco).** —*Arch. Inst. Pasteur d'Algérie.* 1932. June. Vol. 10. No. 2. pp. 157–158.

Although a report regarding schistosome infection at Erfoud was in fact filed at the Institute of Hygiene, Rabat, this was generally unknown until six European soldiers, who had been transferred to Fez after serving 6 to 24 months in Erfoud, were found suffering from vesical schistosomiasis. Of the six, four had come for treatment, the two others being so little incommoded that they were discovered only after a routine examination of the whole detachment. *C. L.*

ROBERT (Léopold). Un cas de bilharziose intestinale à *Schistosoma haematobium* chez un Européen. [**European Case of Rectal Bilharziasis due to** *S. haematobium.*]—*Bull. Soc. Path. Exot.* 1932. July 6. Vol. 25. No. 7. pp. 829–831.

An examination of the stool in a man who had been long and energetically treated with quinine showed the terminal-spined eggs of *S. haematobium.* Following rectal lavage by 1 cc. of oil of chenopodium in 100 cc. of olive oil, ova ceased to be found and the man improved in health. Eggs were never found in the urine. *C. L.*

JEWELL (N. P.). **Schistosomiasis.**—*Jl. Trop. Med. & Hyg.* 1932. Nov. 1. Vol. 35. No. 21. pp. 326–328. With 1 chart in text.

Four Europeans who bathed in a pool in northern Kenya suffered from identical symptoms, those in one of them being described in detail. On leaving the water there was severe irritation of the skin. There followed after an incubation period of 20 days irregular fever, dysentery of the amoebic type with one entry " microscopically an amoebic stool," cough, urticaria, cyanosis, high eosinophilia. He had in turn emetine, stovarsol and, on a provisional diagnosis of schistosomiasis, tartar emetic. Ova of *S. mansoni* were found once only, on the 61st day after infection and the tenth day after tartar emetic was begun. Cure resulted. *C. L.*

SNELL (John A.). **Surgical Conditions complicated with Schistosomiasis.**—*Chinese Med. Jl.* formerly *Nat. Med. Jl. China.* 1932. July. Vol. 46. No. 7. pp. 656–660. With 8 figs. on 4 plates.

The possible role of *S. japonicum* in appendicitis, tubercle infection and cancer is discussed. An instance is given where calcified ova were present 18 years after possible exposure to infection. *C. L.*

TUBANGUI (Marcos A.). **The Molluscan Intermediate Host in the Philippines of the Oriental Blood Fluke** *Schistosoma japonicum* **Katsurada.**—*Philippine Jl. Sci.* 1932. Oct. Vol. 49. No. 2. pp. 295–304. With 5 plates. [14 refs.]

The molluscan intermediary of *S. japonicum* being still unidentified in the Philippines, Tubangui found in *Blanfordia quadrasi* (*Prososthenia quadrasi* Möllendorf) a fork-tailed cercaria indistinguishable from that of *S. japonicum.* It infested mice, rabbits, and monkeys. The worms, too, were indistinguishable from *S. japonicum* and the snails were infected from the miracidia of this fluke. *C. L.*

ARCHIBALD (R. G.) & MARSHALL (A.). **A Descriptive Study of the Cercaria of** *Schistosoma mansoni* **in the Sudan.**—*Jl. Trop. Med. & Hyg.* 1932. Sept. 1. Vol. 35. No. 17. pp. 257–259. With 1 coloured plate.

" Some of the recorded studies of the schistosome cercariae are worthless, inasmuch as no attention has been given to LEIPER'S postulate that the identification of any species of cercaria is only practically possible by recovering the adult worm from experimentally-infected animals." Lateral-spined ova were obtained by washing faeces from Sudanese cases, the miracidia were allowed to penetrate *Planorbis alexandrinus* from the irrigation canals of the Gezira—a district which may be considered as non-endemic for *S. mansoni* infection. About 8 weeks later cercariae began to escape from the snails. They were applied to the skin of a healthy *C. sebaeus.* On its death 55 days later large numbers of *S. mansoni* were recovered from the mesenteric veins of the intestines. The cercariae, whose identity was in this way exactly determined, are described. There were 5 pairs of penetration cells, 3 pairs of flame cells and 2 pairs of ciliated areas in the body, and one pair of flame cells in the tail stem, so that apart from a few minor differences in measurements their findings confirm those of KHALIL (1922). *C. L.*

ARCHIBALD (R. G.) & MARSHALL (A.). **A Study of Some Cercariae obtained from Molluscs in the Sudan.**—*Parasitology.* 1932. Oct. Vol. 24. No. 3. pp. 344–349. With 5 figs. on 1 plate.

Five cercariae, two being furcocercous, are described as " *Cercaria sudanensis* No. 4 to 8," thus leaving the way clear for valid naming later. *C. L.*

KOURI (Pedro) & ARENAS (Rogelio). *Praticolella griseola,* Pfeiffer, Probable huesped intermediario de la *Fasciola hepatica* L., en Cuba. [*P. griseola,* **Probable Intermediate Host of** *F. hepatica* **in Cuba.**]—*Vida Nueva.* 1932. Nov. 15. Vol. 30. No. 5. pp. 329–346. With 6 figs. English summary.

A broken-off search has been made for the intermediate host of *F. hepatica* in Cuba. Radiae and cercariae believed to belong to this species

were found in 15 to 20 snails—*Praticolella griseola* Pfeiffer, which has apparently been imported from the United States. Finances failing, infection tests have not been carried out. *C. L.*

BACIGALUPO (J.). *Limnea viatrix* d'Orb. infectée par des cercaires de *Fasciola hepatica*, à Buenos Aires. [*L. viatrix* **at Buenos Aires infected with Cercariae of** *F. hepatica*.]—*C. R. Soc. Biol.* 1932. Dec. 9. Vol. 111. No. 38. p. 828.

Cercariae found in *Limnea viatrix*, encysted in the open. The cysts fed to guineapigs produced *F. hepatica* infection. *C. L.*

AKAMATSU (A.). **The Significance of Japanese Weasels as the Last Host of** *Hepar Distoma—Clonorchis sinensis, Distomum Innocu[u]m* **Spalthum.**—*Jl. Public Health Assoc. Japan.* 1932. Oct. Vol. 8. No. 10. pp. 3–4.

Weasels can act as definite hosts of *Clonorchis sinensis*. This YOSHIDA has shown by dissection of wild animals. Akamatsu has produced infection experimentally by feeding them on snails, and has recovered from hepatic ducts and gall bladder from 220 to 1,000 flukes identical in structure with but smaller than (6 to 10 mm. by 0·3 to 0·5 mm.) normal forms. Since wild weasels scatter faeces everywhere, they cannot be disregarded in public health. *C. L.*

VOGEL (Hans). Ueber den ersten Zwischenwirt und die Zerkarie von *Opisthorchis felineus* Riv. [**First Intermediate Host and Cercaria of** *O. felineus*.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Oct. Vol. 36. No. 10. pp. 558–561.

Vogel has determined the molluscan host of *O. felineus*. It is *Bithynium leachi*. The miracidium does not hatch in water, but the snail eats the egg whose shell is dissolved by its digestive juices and the freed miracidium penetrates the gut and grows into a tubular sporocyst 1·5 mm. long which takes up its position in the wall of the end gut. The rediae enter the digestive gland and grow to 0·5 mm. long. The cercariae are described, and reach the second hosts as observed by CIUREA. *C. L.*

ERHARDT (Albert) & KEIL (Werner). Weinsäurewirkung bei chronischer Opisthorchiasis. [**Tartaric Acid in Chronic Opisthorchiasis.**]—*Arch. f. Experim. Path. u. Pharm.* 1932. Sept. 12. Vol. 167. No. 3/4. pp. 334–337. With 1 fig.

Of the 4 isomers of tartaric acid only d-tartaric acid proved effective in chronic opisthorchiasis of cats. It is considered that in the body this is changed, at least partly, into the stronger dioxy-mateic acid. The further oxidation product dioxy-acetic acid was inert. In spite of the general view that these 4 isomers are physiologically and pharmacologically alike, their biological action differs. *C. L.*

ERHARDT (Albert). Chemotherapeutische Untersuchungen an der Opisthorchiasis der Katzen. II. [**Chemotherapy in Opisthorchiasis of Cats.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Nov. Vol. 36. No. 11. pp. 610–616. With 2 charts.

For its possible bearing on the treatment of clonorchis infection it may be noted that against opisthorchis in cats fouadin gave good results without the strong local reaction of antimony tartrate. Neostibosan was without effect. *C. L.*

DÉVÉ (F.). Trente-deux années d'étude de l'échinococcose. [**Thirty-Two Years Study of Hydatids.**]—*Prensa Méd. Argentina.* 1932. Aug. 30. Vol. 19. No. 9. pp. 523–534.

An interesting and entertaining epitome of Dévé's life work on hydatid. His proof by experiment (the need of which he insists on over and over again) of the grafting of hydatids over the peritoneum by introduction of scolices from a hydatid, and his other studies in his subject ; Raphael BLANCHARD, dreaded examiner (he ploughed Dévé in parasitology at his first examination for doctorate) and charming friend ; Dévé's views on over-specialism, as when, at the use of the word " scolex " Auguste BROCA at the Société de Chirurgie pleasantly exclaimed " I am no botanist " ; and his defence of his own speciality —32 years devoted to the study of hydatid cysts—to the benefit of many. *C. L.*

i. DÉVÉ (F.). L'évolution vésiculaire du scolex échinococcique. Son importance en pathologie hydatique. [**Development of Hydatid Scolex.**]—*Prensa Méd. Argentina.* 1932. Sept. 10. Vol. 19. No. 10. pp. 598–607.

ii. ——. Le formolage antitoxique des kystes hydatiques. [**Use of Formol in Treatment of Hydatids.**]—*Ibid.* Sept. 30. Vol. 19. No. 12. pp. 723–734. [Refs. in footnotes.]

iii. ——. Rupture spontanée d'un kyste hydatique du foie dans l'abdomen. Hydatopéritoine. [**Spontaneous Rupture of Liver Hydatid in Abdomen.**]—*Ibid.* Sept. 20. Vol. 19. No. 11. pp. 655–664.

i. The fertility of *Taenia echinococcus* is enormous. Each last segment of a strobile contains 500–800 eggs and a hydatid cyst of 2 litres capacity growing from one of these eggs may contain about 2 million scolices. Destruction in nature must be enormous. Moreover when one of these cysts ruptures into the abdominal cavity, each scolex can become a secondary hydatid cyst grafted on to the peritoneum. This evolution can be followed by inoculating such scolices directly into rabbits or by placing them in a collodion sac inserted into the peritoneum of a rabbit. The scolex swells by increase of its interstitial fluid, which collects in the centre, surrounded by a germinative membrane nearly always containing at one point in a disordered heap the 32 to 36 hooks of the original scolex. Each such vesicle is the biological equivalent of an original cyst coming from a hexacanth embryo. These daughter cysts grown within the same collodion sac vary greatly in size ; they have individuality in the matter of growth.

ii. When a cyst ruptures, or its deliberate puncture allows of leakage into the peritoneal cavity, there is risk of anaphylaxis and of wide dissemination of scolices throughout the abdomen. As a killer of the scolex Dévé has since 1903 advised injection of " formol," 1 per cent., into the emptied cyst, and the leaving of it there for 5 minutes, experiment showing that this strength is fatal to scolices. In view of the difficulty of complete emptying of the cyst the strength has since been raised to 2 per cent. which in that time does no harm to the host. The operation can then proceed without risk of seeding the peritoneum with cysts. The prevention of anaphylaxis is aimed at by precipitation of albumin through the means of a newer preliminary injection, namely 2 gm. of potassium ferrocyanide in 970 cc. of water.

This is sterilized at 105° for ten minutes and *at the moment of use* there is added commercial formal 20 gm. and " acetic acid " 10 gm.

iii. A case illustrates spontaneous painless rupture of a hydatid of the liver into the peritoneal cavity. It freed many scolices which were attacked by swabbing and flushing of the abdominal cavity. X-rays showed a few days later that a second cyst was present. This was operated on 4 years later with preliminary formolage and yet another cyst as big as a fist removed from under the mesocolon. A slight urticaria followed the operation. *C. L.*

DÉVÉ (F.). Raréfaction de l'échinococcose ovine en Normandie. Ses causes—Ses conséquences. [**Diminution of Sheep Hydatid Infection in Normandy.**]—*Prensa Méd. Argentina.* 1932. Sept. 10. Vol. 19. No. 10. pp. 593–598.

Human and sheep hydatid infections run parallel. In Normandy there has latterly been a great fall in sheep infection as displayed in slaughter houses, while of human infection Dévé saw an average of 7 cases in the 10 years ending 1914, of 5·1 in the ten years ending 1928, of 3·3 in 1929–31 and none in the first 6 months of 1932. The causes are several. There were 16 million sheep in France in 1913, 9 million in 1930 ; the number slaughtered has notably lessened ; the number of nomadic flocks, wandering from common to common for pasturage under a shepherd and pent in by numerous dogs, is 70 per cent. less, sheep being increasingly kept in hedged fields. All these lessen chances of transference from dog to sheep. Regarding that from sheep to dog, the exclusion of dogs from abattoirs, though not now perfect all over France, is far more strictly observed. In so far as sheep and dog are isolated from one another, so will human hydatid incidence lessen. Perhaps by dog-proof fences it may be possible to effect this in the Argentine, following the example of the United States. *C. L.*

DÉVÉ (F.). L'échinococcose multiloculaire considérée du point de vue de la pathologie comparée. [**Comparative Pathology of Multilocular Hydatid.**]—*Prensa Méd. Argentina.* 1932. Sept. 20. Vol. 19. No. 11. pp. 664–672. [11 refs.]

Regarding the identity or otherwise of the multilocular hydatid of cattle with the alveolar hydatid of man, Dévé points out that there are nearly always morphological differences between the two forms. Macroscopically these are : (1) The bovine form has large intercommunicating loculi rarely as small as a pea, looks like a cauliflower, has gelatinous matter within these, and is invariably sterile : the human form looks worm eaten, its cavities are rarely as big as a pea, it is not always sterile ; exceptions are a case reported by Dévé in 1912 and one by DEW of Melbourne in 1931. (2) The bovine form does not infiltrate, nor does it produce metastases : the human form runs processes into vessels and lymphatics with sometimes adenitis in the corresponding lymph glands or metastases at a distance reproducing the character of the original ; exceptionally the bovine form penetrates veins but never lymphatics. (3) The human form has a tendency to central necrosis ; the bovine has not ; there are two recorded cases of central necrosis in multilocular hydatid. Microscopically the essential differences between multilocular and alveolar hydatid are :

(1) There is cuticle formation in the bovine form, whereas in the human form the germinal layer runs out into the tissue in bare processes. (2) As to the host's reaction, in the human form the processes produce local necrosis : in the bovine form 3 zones are formed near the parasite tall cells simulating cylindrical epithelium, a central zone of granulation tissue with many leucocytes, an outer fibrous zone with concentric arrangement ; as an exception, in DEW's case of 1931 the trizonal arrangement was observed in the liver of man.

Dévé, feeling that his attitude on this matter has not been rightly represented, recalls what he wrote in 1912 which may be rendered thus :—It must then of necessity be admitted that alveolar hydatid is an affection common to man and animals and that, notwithstanding certain differences of appearance in growth, multilocular hydatid is the representation in animals of alveolar hydatid.—The difference, it now becomes clearer, is due to the surroundings of the larval parasite but, as Dévé noted 20 years ago, only experiment can finally settle the matter. *C. L.*

WITENBERG (G.). Zur Kenntnis der Verbreitung von Echinokokkus und Trichinen in Palästina. [**Distribution of Echinococcus and Trichinella in Palestine.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1933. Jan. Vol. 37. No. 1. pp. 37–41. With 1 fig.

Taenia echinococcus is present in 1 in 5 of ownerless dogs in Jerusalem. Artificial infection of cats and foxes (*Vulpes nilotica*) has not been successful, but jackals are naturally infected in Palestine (up to 100 strobiles in one animal) and have been artificially infected also. Palestinian cattle have been found infected to 12 per cent. and those imported from Cyprus to 80 per cent., though many cysts in the latter are barren. Great variations in size of hooks carried by scolices from the same naturally infected dog are figured.

Trichinosis with one exception is unknown in Palestine, swine flesh being forbidden by religion both to Jews and Mohammedans, the exception being an epidemic among Beduins near the Huleh lake. A measly pig has been killed in Bethlehem and a heavily infected ichneumon (*Herpestes ichneumon*) in the desert near Beersheba. *C. L.*

STREIGNART. Un cas de ladrerie révélé par les rayons X. [**Measles disclosed by X-Rays.**]—*Ann. Parasit. Humaine et Comparée.* 1933. Jan. 1. Vol. 11. No. 1. pp. 17–19. With 1 fig.

X-rays applied in the diagnosis of a tibial fracture revealed shadows corresponding in appearance and size to those thrown by calcified *Cysticercus cellulosae.* Permission to remove muscle was refused. *C. L.*

KAWANISHI (K.). **Experimental Studies on the Morphological Changes of the Blood and Clinical Symptoms in Infections with** *Taenia solium* **of Man.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1932. Sept. Vol. 31. No. 9 (330). [In Japanese. English summary pp. 93–94.]

Four persons deliberately infected with *Cysticercus cellulosae* showed some looseness and abdominal pain. Segments appeared after 65 days on the average. There was some gastric hyperacidity and some

lessening of erythrocytes and haemoglobin but no other change in them. There was slight leucocytosis from the 15th to 17th week after infection and an eosinophilia of 15 per cent. at most, the bulk of the leucocytosis being neutrophils (reaching 70 per cent.) while the lymphocytes simultaneously fell to 16 per cent. The other leucocytes were unaltered. The percentage of cysticerci growing to strobiles was 87. *C. L.*

CHI-SHEN (Liang). *Taenia solium*—**Report of a Case.**—*Chinese Med. Jl.* formerly *Nat. Med. Jl. China.* 1932. July. Vol. 46. No. 7. pp. 676–678.

This is the first case of infection with *T. solium* recorded since 1914 in the Cheloo University Hospital; only 9 cases of taeniasis including *C. cellulosae* have been observed in the Peiping Union Medical College in 10 years. *C. L.*

LE MOULT & PIROT (R.). Un cas de téniasis multiple. [**Case of Multiple Taeniasis.**]—*Gaz. hebd. Sci. Méd. de Bordeaux.* 1932. Sept. 18. Vol. 53. No. 38. pp. 595–596.

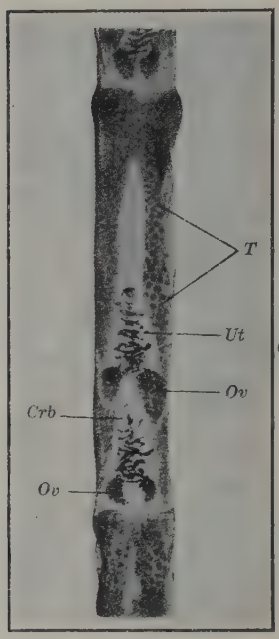
In a man whose stool contained *E. coli* cysts, hookworm eggs, and many onchospheres of *T. saginata,* pelletierine produced 1·25 kg. of tapeworm in which 7 heads were found. He had had some fever, colic, and traces of albumin in the urine. *C. L.*

WATERS (Henry S.) & O'CONNOR (F. W.). *Diphyllobothrium latum,* **Sources of Native Infestation in New York City. Report of Three Cases.**—*Jl. Amer. Med. Assoc.* 1932. Dec. 3. Vol. 99. No. 23. pp. 1941–1942.

Three Jewish children of 5, 2 and 3 years, born in New York and never having eaten fish imported from Europe, had passed segments of *D. latum* from the ages of 13 and 18 months for the last two. Two had eaten "gefüllte" fish raw; in the third there was no history of this. In all cases pike was used for food. Most of the pike, carp and whitefish in New York comes from Manitoba and the U.S. Great Lakes region. *C. L.*

TALYSIN (Th.). *Dibothriocephalus strictus* n. sp. Menschenparasit des Baikalgestades. [*D. strictus,* **Human Parasite on the Baikal Shore.**]—*Ztschr. f. Parasitenk.* 1932. Sept. 5. Vol. 4. No. 4. pp. 722–729. With 7 text figs.

In material produced by giving anthelmintics on a mass scale to persons found passing Diphyllobothrium eggs occurred the 3 strobila on which this new species is based. Two were complete, measuring 47 cm. and 19·5 cm. long respectively, the third was incomplete with a length of 30 cm. The greatest breadth in all 3 was 4 mm., and further back the proglottids were 7 mm. long by 1·5 to 2 mm. wide. The internal structure was that of the genus with the zigzags of the uterine coils more separated than usual. A marked feature of the illustrations is the presence of two sets of genitalia tandem in the same segment, and in one figure there is more than room for a third. The eggs measured 0·054 to 0·057 mm. long by 0·04 mm. broad. [Segment illustration on following page.] *C. L.*



Segment of *D. strictus* showing two sets of genitalia. 9/1. *Crb.* Cirrus-sac, *Ov.* Ovary, *T.* Testes, *Ut.* Uterus.
[Reproduced from the *Zeitschrift für Parasitenkunde.*]

PODJAPOLSKAJA (W. P.) & GNEDINA (M. P.). *Diphyllobothrium tungussicum* n. sp. ein neuer Parasit des Menschen. [*D. tungussicum*, **a New Human Parasite.**]—*Zent. f. Bakt.* I. Abt. Orig. 1932. Dec. 15. Vol. 126. No. 5/6. pp. 415–419. With 6 figs.

In Northern Siberia along the river Nischnaja Tunguska, (?) tributary of the Yenesei river, operculated eggs were found differing to the extent of 23·6 per cent. from those of *D. latum* in that they had an alveolar shell and were rather larger, namely 0·072 to 0·075 mm. long and 0·048 to 0·051 mm. wide. On disinfestation as many as 477 scolices, apparently of the new worm, were obtained from one case. Some figures are given with curious exactness. Total segments 502; first segment showing sexual elements is number 118; ripe proglottids measured 0·56 to 0·63 mm. long and 3·56 mm. broad. *C. L.*

BONNE (C.). **A Few Remarks on Two Rare Parasitic Diseases in the Malayan Archipelago. A. Chromoblastomycosis. B. Sparganosis.** —Reprinted from *Far Eastern Assoc. Trop. Med. Trans. Eighth Congress, Bangkok, 1930. Dec.* pp. 184–187. With 4 figs. on 2 plates.

Sparganosis—Autopsy at Batavia on a labourer from Sumatra revealed infarcts of the right lung, left half of the brain and kidneys, and a local right iliac peritonitis with no lesions in appendix or gut. In an artery of the lung lesion a long pale body was found, taken by the

assistant to be a white blood clot, but the microscope revealed in it particles which on adding acid gave off gas. Dissection showed in another artery of the lung infarct a living contractile body 25 cm. long by 2 to 3 mm. broad with an apical cleft ; in formalin this contracted into the typical shape of the sparganum head. In discussion YOKOGAWA suggested that the parasite had gained access to the vascular system from the brain. *C. L.*

SUMI (I.) & KAWASAKI (S.). **Influences of Ascaris-Infection on the Growth of School Children.**—*Jl. Oriental Med.* 1932. Dec. Vol. 17. No. 6. [In Japanese. English summary p. 73.]

The authors, not accepting previous work on the subject, have divided Manchurian school children [their number is unstated in the summary] into 3 classes :—not infected, infected and untreated, infected and treated. The weights and body lengths were taken at the beginning of the experiment and again 8 months later. The three groups showed no difference in growth. Whether they still remained in their proper classes at the end of 8 months the English summary does not state. *C. L.*

KELLER (A. E.), HILLSTROM (H. T.) & GASS (R. S.). **The Lungs of Children with Ascaris. A Roentgenologic Study.**—*Jl. Amer. Med. Assoc.* 1932. Oct. 8. Vol. 99. No. 15. pp. 1249–1251. With 2 figs.

" While it is not possible to draw definite conclusions, these observations suggest that in children who are infested with *Ascaris lumbricoides* and who show no response to tuberculin tests the widening in the hilar areas with increase in the bronchovascular markings are possibly due to the repeated migration of ascaris larvae through the lungs. They may occur either as the result of the damage done by the larvae themselves or as the result of infection by micro-organisms which invade the pulmonary tissues at the time the larvae escape from the blood vessels into the alveoli. The changes seen on roentgen examination, which have been attributed to the migration of ascaris larvae, are similar to those seen in the childhood type of hilar tuberculosis and may also resemble the changes which occur following repeated nonspecific infections of the lungs." *C. L.*

PENSO (Giuseppe). Sull'azione emolitica dell'*Ascaris lumbricoides* L. [**The Haemolytic Action of** *Ascaris lumbricoides.*]—*Ann. di. Med. Nav. e Colon.* 1932. Nov.–Dec. 38th Year. Vol. 2. No. 5–6. pp. 695–706. [11 refs.]

Studying the three ways in which ascaris may do harm—toxic and irritative, deprivatory, and mechanical or traumatic—the author tested the coelomic fluid, extract of the skin and of the internal organs, *in vitro* and *in vivo* for the haemolytic effect under the first named. The extracts were prepared by maceration and addition of physiological saline. He tested each by adding from 1 drop to 1 cc. of the extract to 1 drop of washed human red cells, the whole being made up to 1 cc. The results were noted at the end of 24 hours at 37°C. Traces of haemolysis were seen even with the smallest amounts and quite distinct with 4–8 drops upwards of the extracts.

For *in vivo* experiments he injected a rabbit intravenously with 18 cc. of the extract in ten days ; no obvious symptoms resulted but on killing the animal he found haemosiderin in the spleen.

He concludes therefrom that ascaris contains a haemolysing substance which is present in the coelomic fluid, the skin and internal organs ; that this is a secretion by the worm for " the saline used for washing the worm acquires the haemolytic property." (See also SCHWARTZ, this *Bulletin*, 1919, Vol. 14, p. 154). *H. H. S.*

ROW (Y. Suryanarayana). **A Case of Dysphagia due to Round Worms.**—*Indian Med. Gaz.* 1932. Nov. Vol. 67. No. 11. pp. 626–627.

A man of 18 had 3 days inability to swallow and was very weak. A gastric washout by tube under chloroform followed by magnesium sulphate led to the passage of an ascaris and to the giving of 5 grains (0·3 gm.) of santonin. 148 ascaris were passed and deglutition gradually became normal within a week. *C. L.*

MIYAMOTO (Masaji). **A Case of Psoitis caused by Round-Worms, with Reflections on the Role of Ascaris in Practical Surgery.**—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1932. Oct. Vol. 31. No. 10 (331). [In Japanese. English summary pp. 103–104.]

In the case reported left iliac pain appeared soon after delivery, the condition was diagnosed as psoas abscess and on operation a female ascaris appeared, two more being discharged during after-treatment.

C. L.

FÜLLEBORN. Zusammenfassung des praktisch Wichtigsten ueber Klinik und Bekampfung der Spulwurminfektion. [**Summary of Knowledge of Ascaris Infection and its Control.**]—*Klin. Woch.* 1932. Oct. 1 & 8. Vol. 11. Nos. 40 & 41. pp. 1679–1684 ; 1716–1720. With 6 figs. [100 refs.]

A valuable summary of present knowledge on ascaris infection. *C. L.*

CRUZ (Walter Oswaldo). Pathogénie de l'anémie dans l'ankylostomose. Importance prépondérante d'une perturbation dans le métabolisme du fer dans l'organisme. [**Anaemia in Ankylostomiasis. Importance of Metabolism of Iron.**]—*C. R. Soc. Biol.* 1932. Nov. 4. Vol. 111. No. 33. pp. 483–485.

Examination at autopsy of the marrow of the femoral diaphysis in ten pure cases of ankylostomiasis showed macroscopically intense redness with no zones of degeneration. Microscopically, with no haemorrhage or congestion, there was good production of leucocytes with predominance of eosinophil myelocytes ; the production of red corpuscles took place in many small foci, there were very many orthochromatic, haemoglobin-containing erythroblasts with pycnotic nuclei ; whole more-developed cells were very rare, but younger cells very common ; their development appears then to cease at this particular point. In malaria, on the contrary, the focal erythroblastic activity is carried on to all stages, there being predominance of karyokinetic forms and of those containing nuclear residues. Again, after disinfestation by removal of 529 hookworms, no hookworm eggs being then found in the faeces, an iron starvation produced by cutting out meat and eggs from the diet was followed by no improvement in the blood condition during a month, while after three weeks of iron treatment it became almost normal. It is concluded that the small haemorrhages produced by hookworms are insufficient to cause the

anaemia and that this condition is simply due to disturbance of iron metabolism.

[That iron is essential for production of erythrocytes is long-established. That the loss to the body of blood, and so of iron, caused by hookworms cannot be accepted as being small is shown conclusively by the observations of FÜLLEBORN & KIKUTH (this *Bulletin*, Vol. 28, p. 234) and WELLS (*l.c.*, Vol. 29, p. 421). That iron is not lost to but stored in the body in malaria is well known; presumably it is then available when needed for blood reconstruction in malaria, but it is not so available in hookworm infection.] *C. L.*

KAWANISHI (K.). **Experimental Studies on the Morphological Changes of the Blood in Percutaneous Infections with** *Necator americanus* **of Man.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1932. Sept. Vol. 31. No. 9 (330). [In Japanese. English summary pp. 91–92.]

Three persons were investigated after percutaneous infections with 150–700 mature larvae. Skin lesions became more marked with repeated infections. One man had bronchitis and pharyngitis for several days after infection, and had many eosinophils in the sputum. Eggs appeared in 57 to 63 days. Erythrocytes fell to 4,000,000 and haemoglobin to 80. Reticulated and polychromatic and basophil erythrocytes increased somewhat. Leucocytosis appeared temporarily and was greater with repeated infection as was eosinophilia (to 50 per cent.), both returning to normal after disinfestation. Neutrophils and lymphocytes fell as eosinophils rose, large mononuclear and transitionals being but slightly diminished. *C. L.*

CORT (W. W.). **Variations in Hookworm Disease.**—*Jl. Parasitology.* 1932. Dec. Vol. 19. No. 2. pp. 142–147. [10 refs.]

The line of argument is this. In pups repeated infections may kill or a crisis may occur with rapid loss of worms till few are left—" self cure " as STOLL styled it. When this condition has been reached a deficient diet may allow of heavy infection which a full diet will diminish. Heavy bleedings will have the same effect. The types of hookworm disease in dogs are designated. In conversation DARLING often noted that a general low local infection in man with a few severe cases seemed only explicable on the supposition of an acquired immunity. [DARLING, however, was satisfied that hookworm larvae were evenly distributed in soil and not concentrated in particular spots so that heavy infection could not arise in a lightly infected locality; this *Bulletin*, Vol. 20, p. 254.] If such resistance is postulated moderate infection with lack of sanitation is explained.

" The usual view that such individuals [some heavy infections among very light ones] have been more exposed to infection than the rest of the population is almost always incapable either of proof or disproof. . . . Where the infestation is comparatively low in spite of soil pollution habits and favorable soil and climatic conditions, it seems probable that the development of host resistance is the chief determining factor . . . The severity of hookworm disease in certain areas of Puerto Rico where the people are badly undernourished supports this view."

[This is contrary to the experience of ASHFORD in Porto Rico.] *C. L.*

DELLA CASA (Vittore). Un focolaio di anchilostomoanemia per la prima volta accertato nella provincia di Pesaro. [**Hookworm in the Province of Pesaro.**]—*Arch. Ital. Sci. Med. Colon.* 1932. Sept. 1. Vol. 13. No. 9. pp. 547–551. English summary (3 lines).

The author details three cases, all women, with mild degrees of anaemia. The cause was wrongly diagnosed for some time—as pregnancy, possible tuberculosis—but examination of the faeces revealed ankylostome ova. The reasons for the delay in diagnosis and, incidentally, for placing the cases on record are that all three were of the Commune of Mondolfo (Pesaro Province), that they had never been away from the district and that hookworm infestation had never previously been reported there. *H. H. S.*

FALLON (W. M.). **A Case of Hookworm Disease.**—*Brit. Med. Jl.* 1932. Sept. 10. p. 515.

In a missionary from Nigeria who had been treated for malaria, two blood examinations revealed an eosinophilia of 75 per cent., with haemoglobin 85 and red corpuscles 4,438,000. Faecal examination showed hookworm eggs in large numbers. One treatment of 45 grains [3 gm.] of particulated thymol left few eggs and a second with thymol and oil of chenopodium 1·5 cc. left none. Perhaps a noteworthy point is that when in Nigeria his stool was blackish. *C. L.*

HARPER (P.). **Complications of Hookworm Disease.** [Correspondence.] —*Brit. Med. Jl.* 1932. Sept. 10. p. 535.

Two conditions are mentioned. The first is a polyarthritis with high fever and a general resemblance to rheumatic fever met with in about two cases a year during the last 8 years. The second is a tendency to haemorrhage, a point of surgical, gynaecological and obstetric importance. Both conditions have disappeared on disinfestation. *C. L.*

BIGGAM (A. G.) & GHALIOUNGUI (P.). **Hexyl-Resorcinol in the Treatment of** *Ancylostoma duodenalis* [*sic*] **Infection.**—*Jl. Trop. Med. & Hyg.* 1932. Dec. 1. Vol. 35. No. 23. pp. 353–354.

Fifty cases were treated with doses of 1 cc. and later, to the number of 28, of 2 cc. of tetrachlorethylene ; 26 were cured, 11 after one dose, 12 after two, 2 after three and 1 after four. Diet restriction before and during treatment was severe. The extremely anaemic and debilitated bore it well ; 2 patients had pain and discomfort in the xiphisternal region on swallowing. The use of old or new gelatine capsules or of paraffin made no difference to the results. *C. L.*

DAVID (Norman A.) & JOHNSTONE (Herbert G.). **Heptylresorcinol in the Treatment of Hookworm Infection.**—*Amer. Jl. Hyg.* 1933. Jan. Vol. 17. No. 1. pp. 287–296. [20 refs.]

Authors' summary :

" Thirteen cases of hookworm infestation were treated with heptylresorcinol with the following results. Six cases treated over a considerable period of time with olive oil solutions of the drug were unaffected. Of

seven cases receiving the crystalline drug in plain gelatine capsules two were cleared. Of the ten cases who later received phenyl-salicylate (" salol ") coated capsules of the drug, 8 were cured. One case of ascariasis was cured by heptylresorcinol in olive oil but one case of trichiuris infestation did not respond to a single treatment of heptylresorcinol in capsules coated with phenyl-salicylate. Better results seem to be obtained when precautions are taken to delay or prevent the absorption of heptylresorcinol. Although only a few cases are here reported in comparison with Brown's study on the effectiveness of hexylresorcinol in hookworm infestation, the findings indicate that heptylresorcinol is not as satisfactory as hexylresorcinol for this purpose." *C. L.*

FOSTER (A. O.) & CORT (W. W.). **The Effect of a Deficient Diet on the Susceptibility of Dogs and Cats to Non-Specific Strains of Hookworms.**—*Amer. Jl. Hyg.* 1932. Sept. Vol. 16. No. 2. pp. 582–601. [10 refs.]

The authors write :—

" Since in earlier work it had been possible to break down the resistance of dogs to infection with *Ancylostoma caninum* due to age and previous infestation, by keeping them for considerable periods on a deficient diet, experiments were planned to see if resistance to non-specific strains of hookworms in dogs and cats could also be reduced by deficient diets. First, mature dogs on a deficient diet were given the larvae of a strain of *A. caninum* which had been shown to be highly infective to cats but only slightly infective to dogs. In five old dogs that came to autopsy after such infections from 7 to 82 worms were recovered, giving percentage developments of from 0·9 to 15·25 per cent. Of five control puppies on a normal diet which were given the same doses of the cat strain larvae as the five old dogs only one became positive with a very light infestation. Since no records are available of old dogs having become infected with the cat strain of *A. caninum*, and since the average infestation of puppies is very low when infected with the same parasite, it seems evident that the effect of the deficient diet was responsible for the increased susceptibility of the experimental dogs to infection with the cat strain of *A. caninum*. An experiment on infecting cats on a poor diet with the dog strain of *A. caninum*, gave percentage infestations significantly greater than had been obtained in the records available on the infecting of mature cats with this strain. The average is also somewhat higher than that recorded for kittens when infected with the dog strain. Experiments with cats on deficient diets are much less satisfactory than with dogs, because the cats are much more easily killed by the poor diets and the experiments have to be much shorter. A few attempts to infect mature dogs on a deficient diet with the larvae of *Necator americanus* were not successful. These experiments suggest the possibility that there may be a relationship between undernourishment and incidental parasitism. Results of this type indicate the importance of the extension of quantitative experimental investigations of the life cycles of parasitic worms in normal and abnormal hosts." *C. L.*

FOSTER (A. O.). **Prenatal Infection with the Dog Hookworm,** *Ancylostoma caninum.*—*Jl. Parasitology.* 1932. Dec. Vol. 19. No. 2. pp. 112–118.

The procedure adopted to prevent postnatal infection was the well-tried one of putting the bitch before parturition in a cage. After their birth the pups were removed twice daily to a clean pail, the cage being meantime washed with hot water and steam and the mother allowed a run in the animal room. A clean burlap bag for bedding was allowed them daily. Three experiments were carried out on pregnant bitches,

which received by mouth numbers of infecting larvae. To one of them 5 pups were born ; two died within a week but no worms were found at autopsy, while the other 3 grew up and remained persistently negative to D.C.F. The second bitch was given 2,500 larvae during pregnancy. Her 5 pups showed hookworm eggs to D.C.F. on the 11th day and died of acute ankylostomiasis between the 12th and 18th days, 297 adult worms being recovered. The third bitch received 3,000 larvae during pregnancy, the 8 pups being born at 58 days (5 days prematurely). From a stillborn pup were recovered one " partially developed larva " by direct examination of the organs after maceration, and 5 filariform larvae by extraction. A second died next day and yielded 6 active larvae on extraction. A third provided a welcome meal for its mother who had been on deficient diet for a week. Of the other 5, four showed eggs to D.C.F. on the 11th day and died from the 22nd to the 25th day ; the fifth which had shown no eggs was killed on the 12th day and 82 mature hookworms were recovered from it. The total worm recoveries at autopsy from all five were 635. In all these cases infective larvae had been given to the bitches before as well as during pregnancy and they had all developed some immunity as judged by falling egg numbers. On the other hand a fourth bitch was given 2,000 larvae, 38 days before parturition, and bore 6 pups. When the litter was a week old circumstances brought about the neglect of cleanliness. D.C.F. first showed hookworm eggs in the pups on the 21st to the 28th days, but from the cleanings of the cage on the 22nd day Baermann's method extracted 26 infective larvae. Accordingly the conclusion is reached that where infection occurred in the first three litters, the pups were infected before birth, though development towards adult life did not begin till after it ; but that in the fourth case infection was postnatal. [The examination method by which Looss established the use of the vascular and pulmonary escalators in cutaneous hookworm infection in pups was by massive serial sections. It is greatly adding in O'Connor's hands to our knowledge of filariasis. By a repetition of these instructive experiments it seems that it could be used to determine when and in what stage the larvae await their host's birth. The failure of extraction suggests that they have developed beyond the filariform stage.] *C. L.*

Bachman (George W.) & Rodriguez-Molina (Rafael). **Skin Reactions to *Necator americanus* in Persons infected with the Common Intestinal Parasites.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1932. Mar. Vol. 7. No. 3. pp. 287–319. [21 refs.]

In this paper the authors analyse the results of 2,901 intradermal tests in Porto Ricans for hypersensitiveness to extracts of *Necator americanus*. The antigen was prepared as a 0·5 per cent. saline extract of dried hook-worm larvae cultivated on charcoal and obtained by the Baermann isolation method. Extraction was made for 12 hours, the extract being subsequently filtered through a porcelain filter and stored on ice. In making the test 0·025 cc. of the test antigen was injected intradermally ; the resulting wheal was measured in 2 diameters at right angles to one another and the results averaged. Any wheal with an average diameter of 0·5 mm. or less was considered negative. The reaction itself, observed within 10 minutes, was characterized by wheal formation, the presence of pseudopods and an erythema ; only occasionally was a delayed reaction noted.

Marked systemic reaction was observed in 2 cases only ; one developed oedema of the eyes, fever and tachycardia. Control antigens prepared from *F. hepatica, A. lumbricoides* and *B. coli* were investigated. Hypersensitiveness to *Necator americanus* test antigen was demonstrated in the 10-minute period in 90–98 per cent. of 1,081 Porto Ricans positive for intestinal nematodes, and the reaction diminished in intensity 5–10 months after treatment. Only 5 per cent. of 115 children under 2 years of age reacted. In 81 per cent. of 1,042 tests on patients negative for intestinal parasites hypersensitiveness was also present. Intradermal tests for *A. lumbricoides* were positive in 92 per cent. of 60 cases tested.

The authors conclude by stating that the measurable characteristics are too variable, and the reactions are not significantly specific for the practical application of the skin test in detecting *Necator americanus* in individuals infected with two or more intestinal nematodes.

N. Hamilton Fairley.

[The primary essential for determining the scientific and clinical value of antigen-based tests is that the diagnostic technique employed should distinguish, as accurately as present knowledge allows, between infected and non-infected persons. In the laborious work here reported Stoll's caustic soda egg-counting method was used for this purpose. Maplestone's completely independent evaluation of its worth in this respect should be consulted (see page 203).—*C. L.*]

FÜLLEBORN (F.). Ueber die Taxen und das sonstige Verhalten der infektionsfähigen Larven von Strongyloides und Ancylostoma. II. Mitteilung. [**Behaviour of Infective Larvae of S. and A. in Regard to Taxis.**]—*Zent. f. Bakt.* I. Abt. Orig. 1932. Nov. 17. Vol. 126. No. 3/4. pp. 161–180. With 12 figs. [13 refs.]

In October, 1930, Clayton LANE published a paper on the Behaviour of Infective Hookworm Larvae in which he stated that he could find no evidence of rheotaxis (motion against a current) or thermotaxis, or indeed of any kind of taxis or tropism but thigmotaxis (reaction to contact) [see this *Bulletin*, Vol. 28, p. 228]. Fülleborn criticizes LANE'S conclusions. LANE said that an animal always enclosed in water as a condition of its life could not be subject to hydrotaxis : Fülleborn contests this. As to thigmotaxis, defined as a directing attraction between the anterior end of the larva and some stable body, which causes the larva to place itself at right angles to the surface of that body, Fülleborn thinks it has not been demonstrated. As to thermotaxis, which LANE was unable to demonstrate, Fülleborn says he has shown it by the microcinematograph. Other contentions and the arguments on which they are based will be considered when Clayton LANE'S further contribution to the subject has been published.

A. G. B.

CHANDLER (Asa C.). **Experiments on Resistance of Rats to Superinfection with the Nematode,** *Nippostrongylus muris.*—*Amer. Jl. Hyg.* 1932. Nov. Vol. 16. No. 3. pp. 750–782. With 3 charts. [13 refs.]

In view of the importance of resistance to helminthic infection, any possible addition to our meagre knowedge, even if from the white rat, deserves note. No more than human beings were all white rats found

to be equal. Some took infection readily, some did not. Diet had no discovered influence unless the animal ceased to thrive, but if that were so the percentage of worms acquired was increased. Some resistance was induced by repeated reinfection. In these days when egg-counts are so widely set on pedestals as sure measures of worm loads, it is interesting to note that inoculation of larvae of *Longistriata* species, which do not mature in white rats, reduced egg output of *N. muris* to one-tenth. Resistance showed itself in interference with reproduction, in stunting, and in failure to reach adult life, in failure to attain establishment in the intestine, and in expulsion of worms. *C. L.*

NAGATY (H. F.). **The Genus** *Trichostrongylus* **Looss, 1905.**—*Ann. Trop. Med. & Parasit.* 1932. Dec. 16. Vol. 26. No. 4. pp. 457–518. With 77 figs. [66 refs.]

A critical illustrated study of *Trichostrongylus* species. So far as medical parasitology is concerned there should be noted the placing of *T. delicatus* Hall, 1916, in the synonym of *T. colubriformis* (Giles, 1892), a change in which HALL concurs. *C. L.*

YOSHINO (K.). **Clinical Observations on 25 Cases of** *Strongyloides stercoralis* **in the Yaeyama Archipelago.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1932. Oct. Vol. 31. No. 10 (331). [In Japanese. English summary p. 99.]

During 4 years 25 cases were seen (16 in farmers between 20 and 40 years old) and mostly serious ones; 13 died from complicating diseases particularly bronchitis. Indeed 14 suffered from this, and in 1 of them eggs and rhabditiform larvae, and in two more filariform larvae, were found in the sputum. For this reason they are considered as probably ascribable to auto-infection [but it does not seem reasonable to ascribe the presence of eggs and rhabditiform larvae in the sputum to any other cause than nemidiae parasitizing the air passages.] *C. L.*

KREIS (Hans A.). **Studies on the Genus** *Strongyloides* (**Nematodes**).—*Amer. Jl. Hyg.* 1932. Sept. Vol. 16. No. 2. pp. 450–491. With 42 figs. [35 refs.]

The helminthic material is grouped into 2 morphological species: *S. stercoralis* in man and dog and *S. simiae* in *Ateles* and *Pithecus*. In the first and second rhabditiform larvae of the indirect cycle and in the rhabditiform sex generation the oesophagus shows three structures described as spears, those in the dog being much smaller than in the monkey; they are not present in the parasitic female nor in the filariform larva. "In describing *Oxyuronema* I stated that this spear-apparatus has on the one hand the function of boring into the wall of the intestine and, on the other, of transferring the toxins of the esophageal glands into the vessels of the host." [It will be noted however, that, as Kreis points out, they are absent just in those forms which presumably need them for penetration or food. Moreover the figures show that they lie in the second and not the first part of the oesophagus; transverse sections, if made, would presumably show whether they functioned apart from the tripartite cuticular oesophageal lining of which they seem to be part.]

A parasitic male, it is claimed, is present. It is described, closely resembles the free-living male, and the circumstances of the finding are as follows :—

" The strain of *Strongyloides* in man, as well as in the dog, which I had for examination, contained only individuals of the direct life-cycle, *i.e.*, without a " free-living " generation. I found in both cases a male, which must be taken to be the parasitic male. In man I found on one occasion two males in a sample. One of these males was in the molting stage. The second time a single male appeared in another sample somewhat later. On the day when the specimen was obtained the first sample contained filariform larvae, while the second sample showed rhabditiform larvae. In the material, which I got from a dog, I found one living male besides rhabditiform and filariform larvae."

It seems nowhere stated how fresh the faecal samples were and doubtless the matter will be checked by search within the gut of dogs killed for the purpose.

The indirect cycle of development may be divided into 2 categories :— " *a*. The pure indirect cycle, *i.e.*, without a development of the filariform larva from the first rhabditiform larva. *b*. The modified indirect cycle, *i.e.*, the development of the filariform larva from the first rhabditiform larva (probably a mixed strain). The parasitic female of the indirect type is probably parthenogenetic." *C. L.*

McCoy (O. R.). **Experimental Trichiniasis Infections in Monkeys.**—*Proc. Soc. Experim. Biol. & Med.* 1932. Oct. Vol. 30. No. 1. pp. 85–86.

Experimental trichinosis, the first experiments believed to have been carried out on monkeys, involved *Cebus capucinus*, *Ateles dariensis*, *A. geoffroyi*, *Alouatta palliata palliata*, *A. palliata inconsonans*, *Leontocebus geoffroyi*, *Saimiri örstedii* and *Aotus zonalis*. Infection was by counted numbers of larvae given by stomach tube. Doses of 5 larvae or more per gram of body weight were invariably fatal. Many intestinal adult worms persisted 4 to 6 weeks after infection. Each larva administered produced 396 to 1,108 (average 698) larvae in muscles. Rats developed a very definite immunity to reinfection ; 12 monkeys that recovered did not always do so. *C. L.*

Fidel Fernandez (Martinez). Un caso de diarrea por tricocefalos. [**Trichuris Diarrhoea.**]—*Medicina Países Cálidos.* Madrid. 1932. Nov. Vol. 5. No. 6. pp. 507–509.

The patient was an adult who suffered for three years with intractable diarrhoea for which no cause could be assigned. The forms of treatment and list of drugs tried are given and he appears to have suffered much of many physicians.

The faeces having been found to contain ova of *Trichuris trichiura* in considerable numbers, thymol 2 gm. in four cachets was given on alternate days to the patient fasting, one cachet every half-hour, followed by a laxative 2 hours after the last dose. Eight days later the diarrhoea had cleared but ova were still being passed. The treatment was therefore repeated after a week's interval. The symptoms disappeared entirely and subsequent examinations failed to discover any ova. *H. H. S.*

i. EPSTEIN (Sch. I.) & FJODOROWA (T. W.). Zur Epidemiologie der Enterobiose. [**Epidemiology of Enterobiosis.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1931. Vol. 10. No. 4. pp. 365–368. [10 refs.] [In Russian. German summary p. 368.]

ii. OLEINIKOW (S. W.). Zur Revision der Frage ueber die Invasionswege des *Enterobius vermicularis.* [**Channel of Invasion of E. *vermicularis*.**] — *Ibid.* pp. 369–379. [In Russian. German summary pp. 379–380.]

i. Nose, mouth and throat were swabbed with glycerine and water, and parts of the skin were washed in warm water, for recovery of eggs of *E. vermicularis* in 23 persons. The degree of bodily uncleanliness of the selected 23 is unstated. In the navel and groin, eggs were present in 69·5 per cent., in the axilla and hip 54·1, and in the vulva and folds of the abdomen 26 ; one person shed 450 eggs from the skin in 24 hours. The nose, mouth and throat were particularly infected. The greatest haul of adult worms from one person was 12,123.

ii. The eggs are rarely found in the palm of the hand, and, apart from finger sucking and nail biting, infection is believed to be in the main air borne. *C. L.*

HICKS (E. P.). **The Transmission of *Wuchereria bancrofti* in Sierra Leone.**—*Ann. Trop. Med. & Parasit.* 1932. Oct. 29. Vol. 26. No. 3. pp. 407–422. [25 refs.]

The author's summary is as follows :—

" 1. Human infections with *W. bancrofti* are common in Freetown.

" 2. Larval nematodes, presumed to be *W. bancrofti*, have often been found in dissections of wild *Anopheles* in West Africa.

" 3. To determine the vectors of *W. bancrofti* in Freetown, laboratory-bred mosquitoes were fed on patients known to harbour *Mf. bancrofti* in the blood, and were dissected after a suitable interval.

" 4. *A. costalis* and *A. funestus* both allowed complete development of the larvae. As they are also found infected in nature they must be regarded as important carriers.

" 5. *A. rhodesiensis* allowed complete development. But as there is no record of its infection in nature and its biting habits are uncertain, it is not possible to decide its importance in transmitting filariasis under natural conditions.

" 6. *A. squamosus* allowed complete development. It has been found infected in nature, but is an uncommon mosquito in Sierra Leone, and therefore must be considered unimportant as a host.

" 7. *S. fasciata.* Of thirty-nine specimens which fed on blood containing *Mf. bancrofti* and which survived to the fourteenth day after the meal, only one developed a proboscis infection. This must be considered exceptional, as many of this species have previously been fed experimentally without allowing complete development of the larvae, and as dissections of wild mosquitoes have not shown proboscis infections. *S. fasciata* is not a vector of *W. bancrofti.*

" 8. *C. nebulosus* appears to be unwilling to bite man. It can therefore be disregarded as a vector.

" 9. Mature larvae dissected from experimental *A. costalis* and *A. funestus*, and those from wild mosquitoes of these species were indistinguishable from each other, and conformed to the usual description of the mature larva of *W. bancrofti.*" *C. L.*

RAO (S. Sundar) & IYENGAR (M. O. T.). **Experimental Infection of Some Indian Mosquitoes with** *Wuchereria* (*Filaria*) *bancrofti*.—*Indian Jl. Med. Res.* 1932. July. Vol. 20. No. 1. pp. 25–34.

Experimental infections were produced with the results shown in the Table. Natural infections were observed in *A. ludlowi*, *A. philippinensis* and *C. fatigans*. *C. L.*

Serial number.	Species of mosquito.	Number of specimens examined.	Number found with filariae.	Number of filariae found in one specimen.			Time taken for development of mature larva.
				Maximum.	Minimum.	Average.	
1	*Anopheles hyrcanus* var. *nigerrimus*	27	15	32	1	6·7	12 days
2	*Anopheles barbirostris*	10	4	4	3	3·5	15 days
3	*Anopheles subpictus*—						
	(*a*) Salt-water race	34	26	20	5	8·5	11 days
	(*b*) Fresh-water race	29	21	15	1	5·1	
4	*Anopheles ludlowii* var. *sundaica*	41	28	18	1	7·0	10 days
5	*Anopheles stephensi*	39	36	30	2	12·2	10 days
6	*Anopheles fuliginosus*	43	30	12	1	4·8	10 days
7	*Anopheles pseudojamesi*	15	6	5	1	2·5	
8	*Anopheles varuna*	19	16	18	2	6·5	
9	*Anopheles pallidus*	42	28	55	1	14·9	11 days
10	*Anopheles philippinensis*	3	3	23	21	22·3	
11	*Culex fatigans* ...	212	152	20	2	7·2	11 days
12	*Culex vishnui* ...	4	1	2	—	2·0	
13	*Aëdes* (*Stegomyia*) *aegypti*	50	3	4	2	2·7	Not likely to mature
14	*Aëdes* (*Stegomyia*) *vittatus*	27	0	—	—	—	
15	*Armigeres obturbans*	98	0	—	—	—	
16	*Taeniorhynchus* (*Mansonioides*) *annuliferus*	6	0	—	—	—	

IYENGAR (M. O. T.). **Filariasis in North Travancore.**—*Indian Jl. Med. Res.* 1932. Oct. Vol. 20. No. 2. pp. 671–672.

A preliminary note states that in the coastal taluks of Shertalai and Ambalapuzha there exists a filarial infection different from that in any part of India, the nocturnal microfilaria resembling that of *Mf. malayi*. In other parts of Travancore *W. bancrofti* prevails. This atypical filaria did not develop in 800 experimental *Culex fatigans*, but readily did so in *Mansonia annulifera*. In the latter natural infection was found in 26 per cent. of over 900 specimens. [Regarding the claim that the infection occurs nowhere else in India, see this *Bulletin*, KORKE, Vol. 27, p. 987 and (Dutch Indies) BRUG, Vol. 29, p. 76.] *C. L.*

KORKE (Vishnu T.). **Observations on Filariasis in Some Areas in British India. Part VIII.**—*Indian Jl. Med. Res.* 1932. July. Vol. 20. No. 1. pp. 335–339. [14 refs.]

"1. Examination of the blood of one thousand persons taken at night between 7 and 10 p.m. failed to give any evidence of the incidence of filariasis in the Punjab.

"2. A comparison of conditions in different parts of Bihar and Orissa and the observations now recorded in the Punjab suggests that there may be some correlation between low altitude of a land and associated rice cultivation, and the occurrence of endemic filariasis." *C. L.*

GIGLIOLI (George). **A Contribution to the Study of the Etiology of the Disease Syndrome in *Wuchereria bancrofti* Infection.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1933. Jan. 31. Vol. 26. No. 4. pp. 379–382.

The question of the filarial or bacterial causation of the acute inflammatory manifestations associated with filarial infection is considered. In British Guiana patients with filariasis constantly apply for vaccine treatment. Giglioli has made numerous attempts to prepare autogenous vaccines for a like use. He has never obtained positive cultures from serum drawn by puncture from the inflamed tissues of uncomplicated typical filarial lymphangitis and lympho-adenitis when these have no progressed to suppuration; and this is the case both in elephantiasic and non-elephantiasic subjects. In some cases in which suppuration occurred, pus smears proved negative and cultures remained sterile. Being at that time engaged on the study of fixation abscesses, it occurred to Giglioli that if these inflammatory attacks were due to a hidden streptococcus, this was likely to be made evident, if a fixation abscess were produced deep in an acutely lymphangitic tissue. A case is described in which such an abscess was produced by turpentine injection. Its contents were negative to Gram staining and to culture on agar, blood agar, glucose broth and hydrocele broth. "The negative result of this experiment definitely corroborates O'Connor's thesis: the presence of pyogenic organisms in filarial disease appears to have only the significance of a secondary infection."

C. L.

GRACE (A. W.), GRACE (Feiga Berman) & WARREN (Shields). **The Parallel Incidence of *Filaria bancrofti* and the β-Haemolytic Streptococcus in Certain Tropical Countries.**—*Amer. Jl. Trop. Med.* 1932. Nov. Vol. 12. No. 6. pp. 493–508. With 3 figs. [10 refs.]

Authors' summary :—

"1. A cultural examination of one hundred consecutive abscesses in Jamaica shows that only 6 per cent. contain the β-haemolytic streptococcus, the remainder containing the staphylococcus.

"2. A filarial census of 250 unselected persons together with routine laboratory observations over many years reveals that while *Filaria bancrofti* is occasionally introduced it does not spread in Jamaica although the requisite mosquito vector abounds in the island.

"3. There is, thus, in Jamaica a parallel low incidence of the β-haemolytic streptococcus and of *Filaria bancrofti* comparable to the parallel high incidence of these agents in British Guiana and in St. Kitts.

" 4. Lymphangitis and elephantiasis are both very rare in Jamaica.

" 5. Histological, clinical and bacteriological evidence from a case of elephantiasis in Jamaica appears to support the hypothesis that elephantiasis in the Caribbean tropics is associated with the presence of many minute foci of the β-haemolytic streptococcus in the corium of the affected part.

" 6. Intramuscular abscesses, whose relation to *Filaria bancrofti* is still in dispute, are practically unknown in Jamaica." *C. L.*

FROES (H. P.). Microfilaires vivantes dans le liquide séro-fibrineux d'un épanchement péritonéal, chez un ancien paludéen parasité par *Wuchereria bancrofti*.—*Ann. Parasit. Humaine et Comparée.* 1933. Jan. 1. Vol. 11. No. 1. pp. 20–21.

——. **Presence of Microfilariae in the Ascitic Sero-Fibrinous Effusion of a Patient Infested with** *Wuchereria bancrofti*. **(Preliminary Report.)**—*Jl. Trop. Med. & Hyg.* 1933. Jan. 2. Vol. 36. No. 1. p. 6.

In a patient seen at Bahia infected with *P. falciparum*, *S. stercoralis* and hookworms, and having *Mf. bancrofti* with no periodicity in the blood as established by two-hourly tests, and an ascites, Froes drew off the ascitic fluid on two occasions hoping to find strongyloides larvae but found instead living microfilariae.

" This is apparently the first time that microfilariae have been detected in a non-chylous and non-haemorrhagic peritoneal effusion, the diagnosis being made while the patient is still alive. It may be that the embryos were attracted by the liquid, as they were circulating in blood or lymphatic vessels in the vicinity of the ascitic effusion. It is not easy to explain the absence of periodicity of the microfilariae in the blood of this patient."

C. L.

JURGENS (A. L.). De overbrenging van Filaria malayi in de onderafdeeling Mamoedjoe. [**The Transmission of** *Filaria malayi* **in the District of Mamoedjoe (W. C. Celebes).**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1932. July 19. Vol. 72. No. 15. pp. 953–959.

The author's experiments showed *A. barbirostris* to be a good transmitter of the filaria, the artificial infection index being 83 per cent., the natural index 8·9. In both instances the larvae were found in the proboscis. This fairly high infection rate of *A. barbirostris* may account for the density of the infection among the village population (37 per cent.) notwithstanding the comparative scarcity of the mosquito. *Taeniorhynchus annulipes*, already known as a possible vector, was present in still smaller numbers. The possibility is left open of *A. punctulatus* being a vector too. An Aëdes species (not identified) could not be artificially infected. *W. J. Bais.*

KNABE (K.). Beitrag zur Dauer von Filarieninfektionen. [**The Duration of Filarial Infections.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Sept. Vol. 36. No. 9. pp. 496–500. [19 refs.]

Two cases are described. In the first, microfilariae were never found. The second infection was with *L. loa* and *A. perstans* acquired in the Cameroons and persisting in Germany from 1915 to 1930. *C. L.*

LEGER (Marcel) & QUEINNEC (P.). Quelques mots sur un traitement de la filariose *Loa*. [**Treatment of Loa Infection.**]—*Bull. Soc. Path. Exot.* 1932. July 6. Vol. 25. No. 7. pp. 690–693.

A case is reported with symptoms of loa infection for 6 years, from which, for the last 4 months, there had been no respite. With intramuscular injections by synthol, 15 in all, they disappeared. Microfilariae, however, did not ; they became very rare before injections, but rose to as many as 10 in a drop of blood some hours after them. Synthol is a 33 per cent. alcoholic solution of trichloraldehyde 8 per cent., menthol 2·5, orthodioxybenzene 2·4, and other unmentioned substances. The man's weight fell during the course of injections from 93 to 87 kgm. In discussion BROQUET reported two cases, husband and wife, treated with a quinine-iron-arsenic preparation, one of whom described the remedy as marvellous, the other being less pleased with it.

C. L.

MOORTHY (V. N.). **An Epidemiological and Experimental Study of Dracontiasis in Chitaldrug District.**—*Indian Med. Gaz.* 1932. Sept. Vol. 67. No. 9. pp. 498–504. With 2 figs.

The disability induced in Chitaldrug, Mysore, by dracontiasis is estimated at Rs.40,000 annually. Step-wells are its source but not all of them, since the same village may contain two, one for high caste Hindus and one for others, and of two instances cited high caste Hindus only were infected in one village and other castes only in the other. Draw-wells when provided may not be used, thus :—" In one place I was surprised to get a reply from an individual that the water in the step-well was so sweet and pleasant to drink that he preferred to drink this infected water and suffer from dracontiasis once a year, rather than drink the brackish draw-well water which he considered a continuous misery." The cyclops " catches the larvae by means of its first pair of legs and with the help of its anterior and posterior pairs of antennae, pushes the larvae gradually into its stomach through the mouth." In a village heavily infected with guineaworm a breach in an embankment let *Barbus* fish into its step-well in which they have since lived ; the worm infection has since almost disappeared. *Barbus puckelli* is a most voracious feeder on cyclops. Effects of hydrochloric acid on cyclops, and on guineaworm larvae within it, are noted, and it seems to be considered that those of gastric juice will be the same. LEIPER's observation is repeated that a heavy infection shortens the life of cyclops. Of 1,363 sufferers from dracontiasis in one year, 1,144 had previously been infected.

C. L.

MOORTHY (V. N.). **Treatment and Prophylaxis of Dracontiasis.**—*Indian Med. Gaz.* 1932. Nov. Vol. 67. No. 11. pp. 617–619.

The author gives the following summary :—

" 1. For purposes of experimental observation a guinea-worm-infected step-well at Kelgote was treated first with copper sulphate and later twice with perchloron at intervals of 3 days. This measure rendered the well quite free from adult cyclops for a period of about a month. In addition, fish belonging to species *Barbus puckelli* were introduced into this step-well so that these might feed on any cyclops that are likely to be formed from the eggs on which the chemicals used had little or no effect. It is to be seen whether this measure will reduce the number of

cyclops in the well permanently and hence also guinea-worm infection in the place. Laboratory experiments show however that this species of fish feed voraciously not only on cyclops but also on guinea-worm larvae.

"2. Weak solutions of asafoetida and an aqueous extract of bamboo leaves have a definitely lethal action on cyclops. This property can possibly be made use of in advocating any household prophylactic measures in the guinea-worm infected villages.

"3. The aqueous extract and also the juice expressed from the young bamboo shoots have remarkable 'cyclopedocidal,' larvicidal, and insecticidal properties."

C. L.

CHACÓN (A. Lachner). The Clinical Symptomatology of Ankylostomiasis.—*Twentieth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1931. pp. 176–178

FERNÁNDEZ (Julio G.), CAPRI (Miguel A.) & CAPURRO (Jorge D.). Obstrucción intestinal por ascárides.—*Semana Méd.* 1932. Nov. 3. Vol. 39. No. 44 (2025). pp. 1274–1276.

FRÓES (Heitor P.) Indentificação de microfilarias vivas em liquido ascitico serofibrinoso, proveniente de um malariento parasitado pela "Wuchereria bancrofti," e em quem se não verifica a periodicidade habitual das microfilarias no sangue peripherico.—*Brasil-Medico.* 1932. Oct. 8. Vol. 46. No. 41. pp. 860–861.

KAWANISHI (K.). Experimental Studies on the Entrance of Bacteria Incidental to Percutaneous Infection of the Human Body with Hookworm.—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa).* 1932. Aug. Vol. 31. No. 8 (329). [In Japanese. English summary p. 82.]

KITAMURA (K.) & TAKADA (I.). Histopathologische Kenntnisse des Lymphangioendotheliome des Hodens bei Filariakranken.—*Japanese Jl. Dermat. & Urol.* 1932. Sept. Vol. 32. No. 9. [In Japanese pp. 818–824. With 3 figs. [14 refs.] German summary p. 110.]

NARITOMI (Chiko). Ein weiterer Fall von *Sparganum mansoni* auf ophthalmologischem Gebiet.—*Taiwan Igakkai Zasshi (Jl. Med. Assoc. Formosa,* — 1932. Aug. Vol. 31. No. 8 (329). [In Japanese. German summary p. 83.]

LEPROSY.

DUBOIS (A.). La prophylaxie de la lèpre au Congo. [**Leprosy in Belgian Congo.**]—*Bruxelles-Méd.* 1932. Oct. 2. Vol. 12. No. 49. pp. 1370–1377.

——. La lèpre dans la région de Wamba-Pawa (Uele-Nepoko).—Extract from *Mémoires Inst. Royal Colonial Belge* (Section Sci. nat. et méd.). 1932. Vol. 1. No 2. 87 pp. (8vo). [Refs. in footnotes.]

——. La lèpre dans la région de Pawa-Wamba.—Reprinted from *Bull. Inst. Roy. Colonial Belge.* 1931. Vol. 2. No. 1. pp. 173–179.

The author visited the North-east Congo to investigate leprosy; the rainfall is heavy and local surveys have revealed that from 4 to 15 per cent. of the population shows signs of leprosy, most often in the form of pigmented macules and running a slow course. He lays stress on the diagnostic value of superficial anaesthesia as described by MUIR, and prolonged search reveals lepra bacilli in about 50 per cent. As regards prophylaxis rigid isolation is impracticable, for with an admitted incidence in the Congo of about 2 per cent. there must be 200,000 lepers. He advises that the highly infectious nodular cases, which form a minority, should be accommodated in special areas and treated with chaulmoogra preparations, although he is not satisfied that they are very efficient, owing in part to the frequent presence in the patients of debilitation due to malarial, worm and syphilitic infections. He advocates leper villages for nodular and mixed infectious cases with land to cultivate and a dispensary for treatment, together with a central laboratory and hospital with a medical man in charge devoting all his time to leprosy.

He records the results of a large number of tuberculin tests from which he concludes that only lepers with tubercle infection give positive reactions. He carried out sedimentation tests also and considers that they give some prognostic indications. Cutaneous reactions with leprolin only partially confirmed the findings of BARGEHR, since the author found both lepers and those living in contact with them gave negative results. *L. Rogers.*

LEPROSY IN INDIA. 1932. Oct. Vol. 4. No. 4. pp. 169–223. With 3 figs. Issued quarterly by the Indian Council of the British Empire Leprosy Relief Association.

This number includes a note by L. LOWE on leprosy and sex which he thinks requires further investigation. In 4,000 children of school age in Travancore both sexes showed 1 per cent. with leprosy. Census figures show a preponderance of males, partly due to the seclusion of females, but among a labour population B. N. GHOSH in an industrial area found more females infected. The provisional conclusions come to are that male lepers preponderate over female at all ages due to less exposure of the latter to infection where they live secluded lives.

J. LOWE also reports on how to prevent pain and other troubles from the injection of hydnocarpus oil and ethyl esters. He lays stress on obtaining pure fresh oil, preferably in June and July, and storing it in well stoppered bottles to avoid oxidation, and sterilizing at 120°C. for half an hour after adding 4 per cent. creosote. The method of making esters is also given.

Leprosy surveys revealed 7·7 per mille in Cuttack town in Orissa and 2·3 per cent. in neighbouring villages, 4 to 5 times as many as shown in the census returns. The Cuttack leper institution has 250 inmates and many early cases attend a clinic. In a hilly area of Kangra in the Punjab 2·4 per mille were found against a census figure of 0·62, and in the Burdwan district of Bengal the figure was 4 per mille, or more than 3 times the official figure: all bearing out MUIR's earlier surveys. *L. R.*

MUIR (Ernest) & SANTRA (Isaac). **Sample Surveys of Leprosy in India.**—*Indian Jl. Med. Res.* 1932. Oct. Vol. 20. No. 2. pp. 421–434. With 1 map.

This paper summarizes the surveys in various parts of India to ascertain the real prevalence of leprosy; a number of these have been dealt with in this *Bulletin*. In a total of 4,560 villages with a population of 2,435,610 persons 16,499 lepers were found or 0·7 per cent., and in 61 districts where the figures of previous census enumerations were available the cases found by the survey parties were four and a quarter times as many. As the 1921 census showed 102,513 lepers in British India the authors conclude that the surveys confirm Muir's estimation of between half to one million cases in all India including many early uninfective lepers. The census figures show the highest incidence in Burma, Assam, East Bengal, the sub-Himalayan and hill districts, Orissa and North Madras; and the lowest mainly in the Punjab, S. United Provinces, desert areas and Mysore. Aboriginals suffer little, but semi-aboriginals in contact with civilized conditions suffer much, especially labour forces. Markets and pilgrimages spread the disease, and debilitating diseases and deficient diets predispose to leprosy. *L. R.*

AUSTIN (C. J.). **Report on Central Leper Hospital, Makogai.**—*Fiji Ann. Med. & Health Rep. for Year 1931.* pp. 36–42. With 6 figs. & 1 diagram.

During 1931 there were 119 admissions, 2 discharged free from the disease and 16 on parole; 39 died, mostly from exhaustion or tuberculosis, and at the end of the year the numbers remaining had risen from 433 to 494, the highest on record. Over half the patients were treated for hookworm infection; 62·2 per cent. were positive bacteriologically. The percentage of improvement was from 70 to 92 per cent. in nerve and 19 to 61 per cent. in skin cases. The women did as well as the men. A storm did some damage, but the patients grew £600 worth of vegetables which were bought by the hospital. *L. R.*

KUPFFER (A.). Ueber die Verbreitungsweise der Lepra. Beobachtungen aus Estland. [**Method of Spread of Leprosy in Estonia.**] —*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Vol. 36. No. 3. pp. 141–186 (1–46). With 1 map.

The author has been in medical charge of the leprosarium at Kuda, in Estonia, for the last ten years' and he has studied the spread of the disease in an isolated area, with 424 recorded cases of leprosy since 1828, when the disease is said to have been imported by Cossacks! Later, cases were observed at the Dorpat clinic. In 1896 the leprosarium was opened in Kuda when there were 63 lepers registered

in the country, in 1900 115 and in 1901 142 cases. An inquiry and a search for cases led to an increase in the registered cases to 270 in 1906, 396 in 1916 and 424 by 1921 of which 283 had died and 143 were still living; the local distribution is given in detail. There are a number of foci, some of which tend to spread the disease more than others, but in the decade 1906–1916 there was some decrease which has most likely continued to the present time because both the number of deaths from leprosy and the number of new cases is smaller. *L. R.*

LEPROSY REVIEW. 1932. Oct. Vol. 3. No. 4. pp. 136–179. With 8 figs. & 1 map on 6 plates; 1933. Jan. Vol. 4. No. 1. pp. 1–45. With 12 figs. (10 on 6 plates). Quarterly Publication of the British Empire Leprosy Relief Association, 29, Dorset Square, London, N.W. 1.

The October issue includes an account of a trial of alepol tabloids in the Federated Malay States; one to three were given orally twice a week with a draught of glucose and sodium bicarbonate to lessen nausea, with or without intradermal injections of iodized esters; the treatment was usually well borne and the impression gained that the combination with intradermal injections was very useful and deserving of further trial.

P. H. J. LAMPE gives an interesting description of the adoption of modern methods of dealing with leprosy in Surinam (Dutch Guiana) under an ordinance of 1929 with a medical board in charge of the measures. These include medical treatment of non-segregated lepers at dispensaries, which is put in the forefront in place of "compulsory segregation, which was to be considered as a punishment." Regular examination of all school children "has proved to be the most efficient way of finding out slight or early cases of leprosy," and 123 out of 8,800 were declared infected by the board, 44 highly so. An open-air "dispensary school" has been provided for 185 children close to the treatment dispensary with 249 patients with about 85 per cent. attendance rate. Cases not highly infectious can be treated at home under the board's control. The Surinam Leprosy Relief Association among other things supplies food for the school children. As the result of these measures the numbers in the asylums has increased from 407 in 1929 to 482 in 1931 for a population of 134,000, the number of children especially having risen and the new measures are considered to be most promising. [Now that both British and Dutch Guiana have adopted modern leprosy methods, when will the British West Indian Islands, with small areas and populations most suitable for stamping out the disease, follow suit?]

Other articles deal briefly with leprosy in the British Solomon Islands with 42 known cases, the Ukuguru district of East Tanganyika, where the true incidence is placed at 25 per mille against an official estimate of only 2·8, and the Katanga area of Belgian Congo where there are said to be at least 1,000 cases with 216 in a colony and 500 registered at a dispensary.

In the January number F. G. ROSE records five years' leprosy work in British Guiana on modern lines since 1926. This is based on measures to induce patients to seek early treatment by propaganda and a change of the law to permit closed uninfective cases to be treated at out-patient clinics, the isolation of open ones as long as they remain

infective, long following up of discharged cases and the removal of new-born children from infected parents. Special attention is paid to examinations of the families of infected persons. These changes led to an increase of the known cases to 477 by the end of 1931 owing to increasing willingness to undergo treatment. Weight charts are of great value in enabling the dose to be increased as long as weight is being gained. The results of intravenous alepol and oil or esters intradermally or intramuscularly in 491 cases, including some only treated a few months, showed 128 with disease arrested, 132 quiescent, 101 subsiding, or a total of 361 (73·5 per cent.) improved, while 18 were stationary, 17 worse and 95 (19·3 per cent.) had died. In early cases 86·6 per cent. had improved, and 9·3 per cent. died, but of 116 control untreated cases only 33·6 per cent. improved and 63·8 per cent. died. Of bacteriologically positive cases 41·2 per cent. became negative after treatment. On the important question of recurrence 14 arrested cases had relapsed but at the time of writing only 6 have failed to recover, so there were only 4·7 per cent. of lasting relapses in 128 arrested cases with complete follow up and re-examination monthly after discharge. Separate buildings and a school are being erected for young children. Only 3 discharged patients were unable to earn their living. Hydnocarpus trees have been grown. These results are very encouraging.

Other articles deal with leprosy in Southern Rhodesia by B. MOISER; the Itu Leprosy Colony in S. Nigeria with 1,012 cases by its founder J. A. MACDONALD; a trial of the gold preparation Solganol in eye cases with improvement in six out of eleven cases; and a note by P. H. J. LAMPE recording his experience in Surinam that many early symptoms in children remain the same or diminish spontaneously.

L. R.

i. MANALANG (C.). **Epidemiology of Leprosy.**—*Monthly Bull. Philippine Health Serv.* 1932. Jan. Vol. 12. No. 1. pp. 5–6; Sept. No. 9. pp. 452–465. [35 refs.]

——. **Transmission of Leprosy. II.**—*Ibid.* 1932. Aug. Vol. 12. No. 8. pp. 363–370. [13 refs.]

ii. ——. **Leprosy—Etiology, Transmission and the Causes of Slow Progress in its Prevention.**—*Ibid.* pp. 378–386. [12 refs.]

iii. PHILIPPINE HEALTH SERVICE. **Transactions of the Open Meeting of the Leprosy Advisory Board held in Manila on October 26 and 27, 1932.**—129 pp. 1932. Manila: Bureau of Printing.

i. In this series of papers the author advances the hypothesis that infections with leprosy only take place in infancy or the first three years of life and that all cases of infection in adults may be dismissed as furnishing no evidence to the contrary because "there has been no record of thorough physical examination to eliminate the presence of early or latent and usually unrecognized lesions before the supposed exposure took place. Therefore, all the evidence to the effect that leprosy is contracted by the adult are fundamentally incomplete, and consequently, unscientific."

ii. The writings of various leprologists are cited, from a consideration of which Manalang concludes that "a non-acid-fast or virus stage of the life cycle of *M. leprae* is probably the etiology of the disease, the acid-fast bacillus stage is inactive." Infants are infected by this virus through the skin, but adults are immune.

iii. In a further paper published in the Transactions of the open meeting of the Leprosy Advisory Board held in Manila on October 26 and 27 (1932) Manalang discusses the pathological work of WADE, HENDERSON and others and his own microscopical work (see below) and concludes that early bacteriologically negative cases of leprosy and the tuberculoid form with very scanty bacilli must be caused by " a virus stage of *M. leprae*, and not by the bacilli." He therefore argues that the search for acid-fast bacilli is not a satisfactory criterion for isolating cases, and that hydnocarpus treatment " is only effective in removing macrophages and inert bacilli, but has no effect on the active virus of leprosy as indicated by the persistence or reappearance of the basic tissue reaction."

Most of the other papers read at the above-mentioned meeting were also published elsewhere and are dealt with below. A note by M. CARREON on a survey of fifteen families of leper children shows that in twelve, or 80 per cent., either the father or the mother was a leper and nine other children showed signs of the disease, so he advocates examinations of the families and close relatives of lepers as proposed by ROGERS.

An interesting and somewhat lively discussion on segregation in the Philippines forms the most important part of the Transactions of this meeting.

Several of the medical men present held that compulsory segregation had failed to fulfil the hopes of its originators as 1,000 new cases still appeared yearly, but nearly all considered that it should be maintained as now modified by the addition of treatment centres near towns and clinics, at which 80 per cent. of the cases were voluntary. W. H. WADE supported segregation and stated that 60 per cent. of the admissions to the Culion settlement were now also voluntary and that they came " for the treatment." Dr. PADUA pointed out that if Manalang's hypothesis was correct " we should segregate the children contacts as well as paroled lepers who are, according to the theory of Dr. Manalang, virus carriers," and he asked, what island or colony would be able to contain them all? J. G. TOLENTINO opened this discussion with a paper on " Why the present system of segregation fails to eradicate leprosy," and he pointed to the fact that of the 600 new cases admitted to a treatment centre in three years only 36·2 per cent. came in the first year of the disease ; he advocated further mitigation of the methods to attract earlier cases, and systematic surveys of the population to find them. Dr. RODRIGUEZ held that " In the Philippines segregation has not been given a really fair trial, because up to a few years ago the people themselves were against segregation." With treatment in hospitals and dispensaries in the provinces its benefits are now beginning to be appreciated. Dr. PANIS agreed that " the modification of the policy of compulsory segregation is now beginning to bear fruit."

No definite conclusions appear to have been arrived at. *L. R.*

LARA (C. B.). **The Parole and Follow-Up of Quiescent Cases of Leprosy and Associated Problems.**—*Jl. Philippine Islands Med. Assoc.* 1932. Oct. Vol. 12. No. 10. pp. 476–485. [20 refs.]

From 1906 to 1921 only 47 cases were paroled from the great Culion settlement, but since the improved treatment was largely used from 1922 to 1931 2,019 were paroled, including a number of earlier cases

treated since the regional treatment stations and skin clinics were opened in 1929, but an active follow-up system has only been carried out since 1930. Released cases are supposed to report locally for examination once a week for two years and then every three to six months for four years, but this could not be enforced in many cases. The author analysed the records of 896 cases considered at some time to have been quiescent between 1922 and 1927, and found that among those quiescent for one year or less 28·8 per cent. had relapsed, against 11·2 per cent. of those who had been quiescent for over one year and only 5 per cent. of those quiescent for over two years. Figures elsewhere are also quoted. In Manila and neighbourhood among those released since 1922 more than 46 per cent. of those traced fairly regularly have returned bacteriologically positive, and the rate was nearly twice as high among those released after a quiescent period of ½ to 2 years over those quiescent over two years. It has therefore been suggested that the earlier release should be stopped and the longer period of quiescence before parole reverted to, but on the other hand it is urged that the policy of earlier release has been very successful in increasing public co-operation, " especially in inducing early cases to present themselves for treatment." *L. R.*

LARA (C. B.). **Observations on Readmitted Cases, with Special Reference to Predisposing Causes of Relapse in Leprosy : I. Factors Already Operating Prior to Parole. II. Factors Operating Subsequent to Parole.**—*Jl. Philippine Islands Med. Assoc.* 1932. Nov. Vol. 12. No. 11. pp. 537–551 ; 552–558. [Refs. in footnotes.]

This is an important study of the frequency of relapses in cases of leprosy released from Culion as far as it has been possible to follow them up. The author concludes : (1) Follow up surveys show a high incidence of relapses partly due to treatment of the released cases not having been regularly carried out.

(2) Of 116 readmitted cases of relapse or " interruption " 52·6 per cent. returned still quiescent, but 47·4 per cent. were active and bacteriologically positive. Of 98 cases readmitted still quiescent 87, or 88·8 per cent., have not shown any sign of relapse, while 11 subsequently relapsed after one to nine years quiescence, but 7 of them had again become quiescent.

(3) The incidence of relapse among readmitted quiescent cases is less than of paroled cases living outside under less favourable conditions.

(4) Inquiry showed that females were slightly more predisposed to relapse than males, especially those between 12 to 20 and 30 to 45 years of age. Cases of more than five years duration relapsed more than earlier cases, but cutaneous and nerve cases showed about equal tendency to relapse. Mild cases treated for a shorter time relapsed more than severe cases treated for longer, and there were also more among those released after a negative period of less than one year than those longer negative before release. The occurrence of lepra reactions during treatment showed no relation to relapse.

From the study of factors operating subsequently to parole it appeared that there were a few more readmitted for relapse among those who had received special treatment during parole, but on the other hand only one-eighth as many of the quiescent cases treated during parole relapsed as of those who received no treatment, and

among 98 readmitted quiescent cases only 4 relapsed of 54 receiving treatment, against 7 of 44 receiving little or no treatment after readmission, so "the evidence is preponderatingly in favour of the value of continued treatment as a means of decreasing the incidence of relapse." Among other factors associated with relapse the most important were in the order given: sexual excess, especially with pregnancy ensuing in women, adolescence, hard manual work, deficient food and poverty. Tuberculosis is also a more or less potent cause of relapse. *L. R.*

SOULE (Malcolm H.) & MCKINLEY (Earl B.). **Further Studies on Experimental Leprosy and Cultivation of** *Mycobacterium leprae.*—*Amer. Jl. Trop. Med.* 1932. Nov. Vol. 12. No. 6. pp. 441–452.

The work already reported on the cultivation of the *Myco. leprae* on media under various tensions of CO_2 and O_2 has been continued and the hormone glycerol agar, with a gaseous environment of 40 per cent. O_2 and 10 per cent. CO_2, has been found most efficacious, while no proliferation has been obtained in any of the air controls; the presence of some oxygen is also necessary to success, so the bacillus is a strict aerobe. In the course of eighteen months a total of sixteen generations has been obtained, but organisms of the ninth to the eleventh serial transfers failed to produce experimental tissue changes in older monkeys than those used in the earlier work. Injections of cultures into guineapigs and mice caused no pathological changes. Serological tests with the cultures failed to give satisfactory results. They were unable to confirm CANTACUZENE's claim to have demonstrated a filterable form of the organism. *L. R.*

PECHKOVSKY (G.) & MALININE (I.). Cultivation des bacilles de la lèpre par le procédé du Prof. G. S. Koulécha. [**Cultivation of Leprosy Bacilli by Koulecha's Method.**]—*Rev. Microbiol., Epidémiol. et Parasit.* 1932. Vol. 11. No. 3. pp. 161–167. [In Russian. French summary pp. 167–168.]

PESCHKOWSKY (G. W.) & MALININ (I. M.). Ueber Prof. Kuleschas Methode der Züchtung von Reinkulturen des Leprabazillus.—*Zent. f. Bakt.* I. Abt. Orig. 1932. Oct. 25. Vol. 126. No. 1/2. pp. 137–145. With 3 figs.

The authors describe the method of G. S. Koulecha of culture of the leprosy bacillus by placing fragments of the spleen removed *post mortem* aseptically in broth with 4 per cent. glycerine with a pH 6·8–7·0. After 4 to 5 months the surface of the medium shows a layer containing acid-fast bacilli resembling those of leprosy. A second generation can be obtained on the same medium, but rarely a third. *L. R.*

DE SOUZA-ARAUJO (H. C.). Essais de culture du *Mycobacterium leprae* (*Coccothrix leprae*, Lutz, 1886) par la méthode de Sumiyoshi-Shiga. [**Attempts to cultivate** *Myco. leprae* **by Shiga's Method.**]—*C. R. Soc. Biol.* 1932. Oct. 21. Vol. 111. No. 31. pp. 331–332.

The author used the cultural methods of Sumiyoshi-Shiga for six months with fresh lepromas excised from 12 lepers, but only once obtained colonies on glycerine agar, after 30 to 60 days, of acid-fast

bacilli resembling those of Hansen and these ceased to grow after two or three generations. He therefore considers it impossible or very difficult to obtain success by Shiga's method which is much inferior to that of M. Ota [see this *Bulletin*, Vol. 27, p. 339]. *L. R.*

OTA (Masao) & ASAMI (Schuzô). Culture du *Mycobactérium leprae muris.* [**Cultivation of** *Myco. leprae muris.*]—*C. R. Soc. Biol.* 1932. Oct. 21. Vol. 111. No. 31. pp. 287–289.

Doubts have been expressed whether the bacillus of rat leprosy has been cultivated. The examination of 2,157 rats in Japan showed 7 per thousand of *norvegicus* and 10 per thousand of *rattus* infected. They succeeded in getting cultures of acid-fast bacilli from the glands of 11 rats on the media of Petragnani or of Petroff in small colonies appearing in 5 to 110 days. *L. R.*

CANTACUZÈNE (J.) & LONGHIN (S.). Transmission expérimentale de la lèpre humaine au rat blanc. [**Experimental Transmission of Leprosy to the White Rat.**]—*C. R. Acad. Sci.* 1932. Sept. 19. Vol. 195. No. 12. pp. 533–535.

The authors have previously recorded proof of the existence of an ultra-virus of leprosy by inoculating into the peritoneal cavity of rats, after treating the mesentery by the method of Van Deinse, a filtrate of an emulsion of lepromata passed through a Bougie L. The rats get ill and in two or three months Hansen's bacilli are found in large numbers in the mesentery. They now report that they have succeeded in producing regularly in rats a fatal infection with Hansen's bacillus. They commence by inoculating into the peritoneal cavity a mixture of 5 per cent. each of sodium diphosphate and calcium chloride, which rapidly produce adhesion of the mesentery, and one to two days later an unfiltered emulsion of a leproma is inoculated into the peritoneum ; a guineapig is also inoculated to exclude the presence of the tubercle bacillus. A chronic disease is thus produced which proves fatal in 5 to 6 months, and *post mortem* the glands all over the body are much enlarged, especially the inguinal and axillary, but with no trace of caseation, and the spleen is two to three times the normal size. Sections of the mesentery, spleen and glands show acid-fast bacilli, but in control animals without the previous treatment of the mesentery the lepra bacilli are completely absorbed in 2 to 3 weeks. The bacilli are often found in masses in cells or granular, and thus resemble that of HANSEN. *L. R.*

LÉPINE (P.) & MARKIANOS (J.). Sur la perméabilité de l'intestin du jeune rat au bacille de la lèpre humaine. [**Permeability of Young Rat's Gut to Leprosy Bacilli.**]—*C. R. Soc. Biol.* 1933. Jan. 13. Vol. 112. No. 1. pp. 19–20.

In this short note the authors report feeding rats free from rat leprosy with a rich emulsion of Hansen's bacillus and examining later for absorption by lymphatics ; guineapigs were inoculated to exclude the tubercle bacillus. They found discharge of the bacilli in the stools after 18 hours, and on killing the rats in 5 to 9 days, and examining minutely the lymphatic glands of the intestinal tract, they obtained negative results with adult rats, but in two young ones still being suckled they found acid-fast bacilli after five days and in one of two after nine days. *L. R.*

AMBROGIO (Agostino). Alcune ricerche sulla colloidolabilità dei sieri lebbrosi. Reazioni chimiche, di precipitazione e di flocculazione. Parte prima. Reazioni di Matéfy, Darany, Baum-Schumann, Klausner, Bruck. [**Researches on Colloid Instability of Leprous Serums. Chemical Precipitant and Flocculant Reactions. Ist Part. Matéfy's, Darany's, Baum-Schumann's, Klausner's, Bruck's Reactions.**]—*Pathologica.* 1932. Oct. 15. Vol. 24. No. 492. pp. 721–729. [44 refs.] English summary.

"None of the above reactions is able to bring a real practical contribution to the biological diagnosis of leprosy. Only a few tests (Matefy's, Baum-Schumann's, Darany's) giving often a positive result with leprous serums, might be employed to support the evidence obtained from clinical and bacteriological researches." *L. R.*

RHEE (Y. C.). **The Relation between Positive Serum-Reaction and Lipoid Substances in the Tissues of Lepers.**—*Japanese Jl. Dermat. & Urol.* 1932. Sept. Vol. 32. No. 9. [In Japanese pp. 784–817. [121 refs.] [English summary pp. 101–110.]

The author has found that lipoid substance can be demonstrated histologically in leprous tissues and that there is a close relation between the quantity of lipoid and the frequency of a positive Wassermann reaction in leprous serum, for, regardless of the type of the disease, there was more marked precipitation of lipoid material in all the 10 Wassermann positive cases. In 25 Wassermann negative cases no lipoid precipitation was found in 12 and extremely little in 6 more and only one had fat in the leprous cells, but in four acute early cases there was much fat precipitation. He thinks that in the breaking down of numerous bacilli in the cells an antilipoid substance is formed and enters the blood. *L. R.*

EMERSON (George), ANDERSON (H. H.) & LEAKE (C. D.). **Lipolytic Activity of Rat Tissues in Experimental Leprosy.**—*Proc. Soc. Experim. Biol. & Med.* 1932. Nov. Vol. 30. No. 2. pp. 150–152.

In view of the suggestion of WALKER and SWEENEY that the action of chaulmoogra oil in leprosy might be due to stimulation of non-specific lipolytic activity of the tissues, which would attack the fatty capsule of acid-fast bacilli, the authors have studied the lipolytic activity of leprous tissues in experimental rat leprosy in comparison with that animal's normal tissues. They now report on the effect of the presence of leprosy in the body on the tissue distribution of lipase in comparison with normal animals and find that leprous tissue is significantly and constantly lower in lipolytic activity than other tissues of infected or normal rats, and the presence of late stage large lesions significantly lowers the lipolytic activity of most tissues of the body with the probable exception of the spleen. *L. R.*

MANALANG (C.). **Significance of Pathologic Findings in Biopsy Materials from Lepers. II.**—*Monthly Bull. Philippine Health Serv.* 1932. Mar. Vol. 12. No. 3. pp. 77–79.

In a brief note the author states that he has examined leprous material from 60 additional cases of early lesions in children and

he maintains that there is an "invisible ultravirus" stage of the leprosy bacillus which is the cause of the so-called early stage, and that after the disappearance of visible bacilli under treatment it is the ultravirus which causes relapses. He also thinks that bacteriologically negative cases may be infective through the presence of the ultravirus. *L. R.*

CHIYUTO (Sulpicio). **Leprolin Test.**—*Monthly Bull. Philippine Health Serv.* 1932. July. Vol. 12. No. 7. pp. 300–307.

MANALANG (C.). **Significance of Leprolin Reaction in the Natural and Experimental Transmission of Leprosy.**—*Ibid.* pp. 308–310.

The first author used one gram of ground-up leprous nodules boiled in 20 cc. normal saline for 30 to 60 minutes and filtered through 3 to 4 layers of gauze, heated to 60°C. for an hour and 0·5 per cent. of carbolic acid added. Children of leprous parents with early neuromacular signs gave 84 positive and 16 negative leprolin reactions. Healthy children without history of leprosy showed 67 per cent. positive, and 10 healthy adults all gave positives. Negative results in children of both groups may be considered a lack of resistance to leprosy.

The second author states that BARGEHR and MITSUDA advocate leprolin vaccinations to produce immunity among attendants. He considers nodule formation in monkeys after intradermal inoculation with leprous material as a leprolin reaction, and that Chiyuto's findings support the view that leprosy is usually contracted in early infancy, so leprolin might be tried as a prophylactic in the infants of lepers. *L. R.*

BADENOCH (Alexander Guthrie) & BYRON (Francis Eric). **The Calcium Content of the Blood Serum in Some Cases of Leprosy.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. Nov. 30. Vol. 26. No. 3. pp. 253–258. [10 refs.]

The authors report with regard to this much discussed subject that lepra reaction is nearly always associated with a low serum calcium figure and other cases have a rather higher but still subnormal content. Repeated estimations in treated cases showed a rise in the calcium with clinical improvement in non-reaction as well as reaction cases. In a few cases a high calcium content was associated with a more rapid advance of the leprotic process. The calcium content of the diet should be considered. *L. R.*

BRANTS (J.). Komplementbindungsreaktion mit dem Tuberkulose-Antigen von Witebsky, Klingenstein und Kuhn bei Lepra. [**Complement Fixation Reaction with the Tubercle Antigen of W. K. & K.**]—*Dermat. Woch.* 1932. Nov. 19. Vol. 95. No. 47. pp. 1688–1691.

WITEBSKY, KLINGENSTEIN and KUHN have studied different fractions of tubercle bacilli extracts extensively and found that alcoholic tubercle bacilli extracts contain lipoids which give complement fixation with syphilitic as well as in tuberculosis sera, so the author has tested their antigens in leprosy cases including 50 nodular, 4 mixed and 26 nerve cases, the Wassermann test also being carried out. With various syphilitic antigens from 40 to 60 per cent. of

nodular cases gave positive results, but only in 1 of 28 nerve cases. The Besredka antigen gave positive results in 25 out of 33 nodular, but weaker and fewer ones in nerve cases. With the antigens of Witebsky *et al*, all the nodular and mixed cases gave positive reactions, which were strong in 46 cases, and of the 26 nerve cases 20 were positive and 5 strongly so, and 6 negative, but one of the latter had been discharged cured and the other five were cases of over 30 years' duration. He therefore recommends that in cases of leprosy with positive Wassermann reactions a complement fixation test with tubercle bacilli antigens should be undertaken by the above method.

L. R.

LAIGRET (Jean). Sensibilité de l'homme lépreux au bacille de la lèpre murine. [**Susceptibility of a Leper to the Rat Leprosy Bacillus.**]—*Arch. Inst. Pasteur de Tunis.* 1932. Dec. Vol. 21. No. 2. pp. 290–293.

A nodular leper aged 56 was inoculated with the rat leprosy bacillus in a fresh rat nodule in the lobe of the right ear and evidence was obtained of the multiplication of the organisms in the human tissues.

L. R.

TISSEUIL (J.). Première série d'essais de traitement de la lèpre chez le rat. [**Treatment of Rat Leprosy.**]—*Bull. Soc. Path. Exot.* 1932. Nov. 9. Vol. 25. No. 9. pp. 969–976.

This is an interesting paper in view of the close similarity of the human and rat leprosy bacilli. Potassium iodide was injected intraperitoneally. With potassium iodide the lesions appeared more slowly but developed more rapidly with rapid decline of the animals. Lipiodol intramuscularly weekly appeared to have a favourable effect as did ethyl ester chaulmoogrates with longer preservation of the general condition of the animals. Molybdate of ammonium intramuscularly had only a slight early retarding effect on the disease. *L. R.*

SARDJITO (M.) & SITANALA (J. B.). Die Dicktropfenmethode zum Nachweis von Leprabazillen im Blut. [**Thick Drop Methods for Demonstration of Lepra Bacilli in Blood.**]—*Zent. f. Bakt.* I. Abt. Orig. 1932. Dec. 15. Vol. 126. No. 5/6. pp. 427–433. With 6 figs.

Various somewhat complicated methods have been used for examining thick drop blood specimens for lepra bacilli. The authors used Ross's malarial method by treating dried specimens by filtered water and staining by the Ziehl-Neelsen plan, sometimes combined with Gram. They took blood from healthy looking skin after cleansing with ether and alcohol. In 33 untreated cases 25 were positive whereas nasal mucus and ear serum gave 26 and 25 positive, in 19 treated cases the numbers were 15, 12 and 12, and in fellow lodgers who are carriers, of 10 examined the figures were 6, 4 and 1. *L. R.*

LARA (C. B.) & SAMSON (J. G.). **Role of Iodine in Iodized Oil Derivatives used as Antileprotic Drugs : Trial of Plain and Iodized Olive Oil Ethyl Esters.**—*Jl. Philippine Islands Med. Assoc.* 1932. Oct. Vol. 12. No. 10. pp. 485–493.

Iodine has long been added to ethyl esters in the Philippines to lessen the pain on injection and a trial of iodized olive oil with marked

improvement has led to further tests as to the value of the iodine by the use of olive oil esters with benzocaine to lessen irritation, with and without the addition of iodine, both used by the intradermal method sometimes supplemented by intramuscular injections. After six months' treatment improvement was found in 57·9 per cent. with the iodized ester as compared with 14·2 per cent. without the iodine, and the results also compared favourably with iodized chaulmoogra ethyl esters. The proportion of iodine did not exceed 0·5 per cent. and of benzocaine 2 per cent. *L. R.*

LE FORESTIER (Roger). Notions médicales actuelles sur la lèpre. Epidémiologie, dépistage clinique et bactério-sérologique, thérapeutique. [**Present Medical Knowledge of Leprosy.**]—*Marseille-Méd.* 1932. July 25 & Sept. 25. Vol. 69. Nos. 21 & 27. pp. 97–120; 377–391. With 5 figs. [Refs. in footnotes.]

This is the commencement of a general discussion of the subject with some notes on the types of leprosy met with in French possessions and illustrations. *L. R.*

COCHRANE (Robert E.). **Leprosy with Special Reference to its Pathology.**—*Irish Jl. Med. Sci.* 1932. Dec. 6th. Ser. No. 84. pp. 693–702.

This paper gives a useful summary of recent work which has already been reviewed in this *Bulletin.* *L. R.*

DE WILDEMAN (E.). Plantes contre la lèpre (*Cynometra* sp.). Note préliminaire. [**Plants used for Treatment of Leprosy.**]—*Ann. Soc. Belge de Méd. Trop.* 1932. Oct. 30. Vol. 12. No. 3. pp. 265–269.

The author reports that the people of the Ivory Coast use the products of certain plants applied to ulcerations in the form of a powder and one of the plants has now been identified as *Cynometra Vogelii,* but he cannot vouch for its value. *L. R.*

RAYBAUD (A.). Drogues végétales employées au Brésil contre la lèpre. [**Plants used for Leprosy Treatment in Brazil.**]—*Marseille-Méd.* 1932. Sept. 25. Vol. 69. No. 27. pp. 392–394.

This is another paper enumerating a number of vegetable species that have been used in the treatment of leprosy in Brazil, but without giving any evidence as to their value or otherwise. The most important is *Carpotroche brasiliensis* which is known to contain chaulmoogric acid.

L. R.

VAN HEUTSZ (J. B.). Lepra en U.C.B. (Leprarsol). [**Leprarsol in Leprosy.**]—*Ann. Soc. Belge de Méd. Trop.* 1932. Oct. 30. Vol. 12. No. 3. pp. 385–393. With 5 figs.

The writer reports a trial of a new preparation called leprarsol made by the Belgian Chemical Union with promising results in 18 cases. *L. R.*

WILSON (R. M.). **Occupational Therapy in Leprosy.**—*Chinese Med. Jl.* formerly *Nat. Med. Jl. China.* 1932. June. Vol. 46. No. 6. pp. 555–559. With 12 figs. on 4 plates.

The author once more reports the good effects of work and exercise as carried out in his Korean Leper Colony. *L. R.*

BORZONE (Rodolfo A.). Inmunidad histógena y sindromes pluriglandulares en lepra. Concepto y ensayo de clasificación y tratamiento etiopatogénico.—*Semana Méd.* 1932. Nov. 17. Vol. 39. No. 46 (2027). pp. 1455–1459. [14 refs.]

FABIANI (G.). Sur un cas de lèpre autochtone en Algérie.—*Arch. Inst. Pasteur d'Algérie.* 1932. June. Vol. 10. No. 2. pp. 177–179.

NETTO (Solano). Cruzada anti-leprosa. A lepra mista.—*Brasil-Medico.* 1932. Oct. 15. Vol. 46. No. 42. pp. 884–885.

PISACANE (Carlo). Considerazioni sulla reazione di Rubino per la lebbra.—*Riv. Sanitaria Siciliana.* 1932. June 1. Vol. 20. No. 11. pp. 785–6, 789. English summary (4 lines).

SPRUE.

ASHFORD (Bailey K.). **The Differential Diagnosis of Sprue and Pernicious Anemia.**—*Amer. Jl. Trop. Med.* 1932. May. Vol. 12. No. 3. pp. 199–215. [23 refs.]

This article is submitted for information of and consideration by those who regard the diagnosis between sprue and pernicious anaemia as "merely a matter of geography" and the two diseases as in essence "identical or at least modalities of a common fundamental condition of nutritional character." It is an adequate summary of the similarities and differences from both the clinical and laboratory aspects and may be read with profit by those living in temperate climates who see in every case of emaciation with stomatitis and bulky stools an instance to be recorded as "non-tropical sprue." No fresh evidence is adduced; it was not the author's intention to do so but to present and weigh up the facts already known to those familiar with the disease and this Professor Ashford has done with his customary ability. *H. H. S.*

RADL (Robert B.) & FALLON (Madeleine). **Nontropical Sprue with Duodenal Involvement and Tetany.**—*Arch. Intern. Med.* 1932. Oct. Vol. 50. No. 4. pp. 595–604. With 2 figs.

Another interesting case to be added to the list of those diagnosed non-tropical sprue—a man of 41 years, who had never been away from the north central region of the United States. He had been weakly from childhood. Eight years prior to the date of this record he began to complain of soreness of the tongue, and this had continued with periods of exacerbation. For the last two years gastro-intestinal symptoms have been troublesome—bulky but not frothy stools in the early morning, increasing in number for the past year. There has been loss of weight ["10 kgm.", but within what period is not stated], but no nausea or vomiting. He had felt numbness and tingling in hands and feet for 4 years. On examination in July, 1928, the papillae of the tongue were atrophied, but no aphthae were seen. Blood pressure was low, 100 systolic, 70 diastolic, red cells 2,870,000 per cmm., Hb. 64 per cent., C.I. 1·1, moderate anisocytosis and slight poikilocytosis. Except for the bulky stools the symptoms cleared with liver treatment.

In February, 1930, his general condition was fairly good, but there were signs of duodenal stenosis and gastro-enterostomy was performed, a large duodenal ulcer being found. He made a good convalescence from the operation, but the diarrhoea continued and in June 1930 tetany supervened and the blood calcium was low, once down to 5·0 mgm. per cent. This was kept under control by calcium lactate and parathormone.

[This case is not so typical as those recorded by Professor THAYSEN; the stools were never frothy, nor clay-coloured, the persistent tingling and numbness of the extremities are not a normal feature of sprue; no analysis of the faeces is recorded. Also there developed a definite intestinal lesion—duodenal ulcer—which would account for some, at least, of the symptoms. In a footnote brief reference is made to

another patient at present under observation with symptoms strongly suggestive of sprue. Report on the further course and developments of this case will be awaited with interest.] *H. H. S.*

GEILL (Torben). Et tilfaelde af ikke-tropisk sprue (Gee's sygdom). [**A Case of Non-Tropical Sprue.**]—*Hospitalstidende.* 1932. May 19. Vol. 75. No. 20. pp. 705–712. With 4 text figs.

Geill finds that non-tropical sprue is undoubtedly more frequent than is generally supposed to be the case, the most common mistaken diagnosis being that of some gastro-intestinal or endocrine complaint. The psychic manifestations may also be so prominent that neurasthenia, hysteria or a psychosis is diagnosed, as in Geill's case. The patient was a 4-para, aged 48, whose menopause dated a-year-and-a-half back. She had never left Denmark. During the last two or three years the stools had from time to time been very light-coloured and bulky. The abdomen was much distended, particularly in the evening. There was no albumen, sugar, blood or pus in the urine. Steatorrhoea, emaciation, atrophy of the tongue, a blood count of the pernicious type, a low calcium content of the blood, tetany, a low blood-sugar curve after the administration of glucose, and a high blood-sugar curve after an injection of adrenalin (which had little effect on the blood pressure and pulse-rate) were observed. Treatment with liver extracts had little effect on the anaemia, but treatment with calcium chloride and irradiated ergosterin was followed by improvement in the blood-calcium content, and by the disappearance of the tetany. The patient's general condition also improved.

C. Lillingston.

BAUMGARTNER (E. A.). **Gastric Acidity in Tropical Sprue. The Return of Free Hydrochloric Acid after its Absence over a Period of Years.**—*Clifton Med. Bull.* 1932. Apr. Vol. 18. No. 2. pp. 40–44.

The patient, a woman of 52, who had lived for 30 years in China, presented some of the symptoms of sprue. Gastric analyses carried out at intervals over a period of 11 years showed absence of free HCl (Ewald test) during the first 7–8 years, but it was present (3–4 in a total acidity of 20) when tested 3½ years later. The blood condition was not typical; on one occasion only was the colour index above unity, it was usually about 0·7 and there is no mention of erythroblasts at any time; chemical examination of the faeces is also not recorded. Obscure nerve symptoms—numbness, tingling, stumbling, dropping of objects—were complained of but no organic lesion was detected. The diagnosis of sprue was based on the previous residence in China, a history of sore tongue with flatulence, large frothy stools, anaemia and loss of weight. *H. H. S.*

VAN DER SCHEER (A.). Parenterale levertoediening bij tropische spruw. [**Parenteral Liver Administration in Tropical Sprue.**]—*Nederl. Tijdschr. v. Geneesk* 1933. Jan. 14. Vol. 77. No. 2. pp. 163–170. [16 refs.] English summary.

The English summary is as follows :—

"Communication of the results of treatment of tropical sprue by subcutaneous or intramuscular injections of liver extract. Symptoms which had resisted the ordinary dietetic treatment during months or years disappeared mostly within a few weeks. This confirms the

opinion that sprue is a deficiency disease. In West-India this deficiency is the result of insufficient feeding which leads first to anaemia and later on to sprue. In Dutch East India on the contrary the first symptom, observed in sprue, is an insufficient resorption of fat by the small intestines of which the cause is unknown. Afterwards, often after a long residence in Europe the characteristic glossitis and anaemia of a hypochrom or hyperchrom type develop." *H. H. S.*

DE RIVAS (Damaso). Some Remarks upon the Etiology of Sprue.—*Bol. Asoc. Med. de Puerto Rico.* 1932. Nov. Vol. 24. No. 206. pp. 610–613.

MISCELLANEOUS.

LAMBERT (S. M.). **Fourth Annual Report on Western Pacific Health Service, 1931.**—*Fiji Ann. Med. & Health Rep. for Year 1931.* pp. 42–46.

The Western Pacific Health Service is the agency under which the various island groups and the Rockefeller Foundation have co-operated; it is under the immediate charge of a Deputy to the Central Medical Authority, who is Chief Medical Officer of Fiji. Its headquarters are at Suva.

Central Medical School.—An extension of the old Fiji Medical School. It has 40 students, 20 from Fiji, 4 each from Tonga, Gilberts and Ellices, Samoa, British Solomon Islands and 2 each from Cook Islands and New Hebrides. There is a permanent Tutor and a faculty of seven qualified men, two registered nurses and one Native Medical Practitioner. The course is one of 4 years. The weakness of the Native Medical Practitioner system has been the lack of inspection by a Medical Officer, but this is now partially remedied.

Hookworm Work.—Mass treatments have been employed in the British Solomons, New Hebrides, Ellice and Fiji, with carbon tetrachloride, and ethylene tetrachloride or tetrachlorethylene. Symptoms of apparent anaesthesia due to the latter drug have alarmed some of the natives; but, it seems, without sufficient cause.

"Apart from these added cerebral symptoms, ethylene tetrachloride gave fewer symptoms than carbon tetrachloride, and we consider it a safe, desirable anthelmintic for hookworm. Carbon tetrachloride is also considered a safe desirable drug for Melanesians and Polynesians, and in combination with chenopodium a safe drug for East Indians. There has been no death from its use now since 1924. During our last four years of treatment work in the South Pacific with ethylene tetrachloride and carbon tetrachloride in 106,029 treatments there have been no deaths and few untoward symptoms. The dosage of these drugs has been unchanged for ten years. Three minims to the year with an adult dose of 45 minims of carbon tetrachloride and ethylene tetrachloride; a mixture of two parts of carbon tetrachloride to one of chenopodium for Indians, two minims to the year of this mixture with an adult dose of 36 minims."

Yaws.—During the past 4 years 220,000 injections of neoarsphenamine or sulpharsphenamine have been given by laymen or native practitioners without a death. The cost has been one penny a decigram, so that with 5 decigrams for an adult dose and 2 or 3 injections, the adult cost has been about a shilling.

"These mass treatments have been given because study showed that in untreated groups the whole population was infected by the age of 12 or 13 to 16, and that among such youths there was always a great number of individuals who at any particular time that treatment rounds were given would show no symptoms or signs, who afterwards would break out with presumably infectious yaws and presumably these kept the disease alive."

In Nui, one of the Ellices with a population of 402, inspection three years after treatment by Native Practitioners showed yaws to have almost disappeared.

Ringworm.—Both Tinea imbricata and Tinea versicolor are found in Fiji; and it has not been possible to distinguish them. Natives believe that those who live near rivers some distance from the sea

are most apt to be infected with Tinea imbricata. Treatment has been by painting with a saturated solution of salicylic acid in strong tincture of iodine. It is not easily cured. Of 164 cases treated in Bua province and re-examined a year later 60 were cured (five had had sulphur fumigation only).

The total treatments during 1931 for the three conditions were 85,610, and the total cost £2,770 18s. 10d., the cost per treatment being 7·7 pence, and in Fiji no more than 4·2 pence. One unit treated both yaws and hookworm, without difficulty.

Bore-hole Latrines.—During the year 1,260 were installed and now there are less than 50 dwellings without adequate sewage disposal within a radius of 9 miles of Suva.

In the New Hebrides a Native Practitioner just arriving is the first to serve in the group and "he may be the germ of a Condominium Medical Service." A second Native Practitioner is just arriving in the Solomons.

It is increasingly evident, writes Dr. Lambert, that most of the problems of public health and preventive medicine in the South Pacific will be solved best by the extension of the Native Medical Practitioner system. Where these men are treated sympathetically they have had a large measure of success, and together with native obstetric nurses, who should be trained in increasing numbers, they should manage the native welfare work over which the Fijians are enthusiastic. *A. G. B.*

CILENTO (R. W.). **The Value of Medical Services in Relation to Problems of Depopulation.**—*Med. Jl. Australia.* 1932. Oct. 15. 19th Year. Vol. 2. No. 16. pp. 480–483.

This interesting and suggestive paper was read at a meeting of the Australian and New Zealand Association for the Advancement of Science. Hitherto the view of W. H. P. RIVERS [see this *Bulletin*, Vol. 20, p. 83] on the causes of depopulation in the Pacific has influenced men's minds, namely that owing to the suppression of native customs, such as head-hunting, the natives have lost all interest in living, succumbing easily to infection and not caring to bring children into the world. To Cilento, however, this is not a cause but an effect, being a direct sequel of disease and of faulty nourishment.

The author shows that apart from humanitarian reasons the depopulation problem is vital because if the races in question are lost they can only be replaced by others "bringing with them economic, social and political obligations of a very grave character." He visualizes the effects of European intrusion as occurring in three stages :—

(1) A stage in which diseases, arms, alcohol are introduced, tribal life is dislocated, and the virile members of the community are recruited for labour, with a large and immediate decline ; this period has long ceased in the Pacific.

(2) A period of partial adjustment, the European imposing his scales of value on the native, and the native imitating European ways of life, with little success for either. The native loses the safeguards of savagery and fails to replace them by protective European customs. This condition of unstable equilibrium is seen in many areas in Melanesia, in which the population is oscillating or slowly decreasing.

(3) The factors for decline get the upper hand and the race disappears or adjustment is affected and population increases again.

During the first period with the prohibition of head-hunting and cannibalism there goes also pig-raising and the hunting a large vitamin-rich fish, and with the occupation by the planters and traders of the best land the native becomes resigned to the decrease in the available food supply, he becomes less virile and practises abortion or infanticide, thus adapting himself to the lessened food supply.

In support of the view that "hopelessness" is secondary rather than primary Cilento writes :—

"Population was found to be declining in places where native institutions flourished with all their original vigour, as well as where they had been destroyed so long as foodstuffs were scanty and disease rife, and people were found thriving in places where white men had entirely disrupted their social organization (as, indeed, they must inevitably disrupt it everywhere in the course of time), but only where disease was controlled and food abundant."

Specific instances are given. The two factors of disease and food deficiency form a vicious circle. The author deals with the section of popular opinion which advocates the introduction of more virile natives and shows that were the local natives to tolerate such introduction history indicates that it would be useless. The problem, which is one of a generation, is to combat food deficiencies and the diseases to which they add a fatal virulence. It is stated that "the native women reach a stage of infertility at an early age (perhaps after the birth of one child or two) and this could be and often was corrected by introducing into the diet large quantities of the growing shoots of plants and other items rich in vitamins." Apart, however, from deficiencies in proteins and vitamin-rich foods the staple yams and taro that make up the main carbohydrates of the diet are threatened, for with European plantations come pests which attack the native staples ; in several localities taro can no longer be grown.

South Melanesia though free from malaria is handicapped by the immigration of Asiatics and their diseases. The distribution of amoebic dysentery and of *A. duodenale* appears to coincide almost exactly with that of the Asiatic population.

There are thus phases in medical administration that go beyond the range of ordinary medical work ; anthropology and agriculture also come in. "The value of medical services in relation to depopulation consists essentially in the degree to which medical services are linked with these complementary and co-operative activities." Finally he stresses the outstanding need for a centre for the adequate exchange of medical information, opportunities for a wider field of interest and better prospects in medical and personal status for the doctors concerned.

A. G. B.

PLACIDI (Th.). La médecine et l'hygiène aux Nouvelles-Hébrides. [**Medicine and Hygiene in the New Hebrides.**]—*Rev. Méd. et Hyg. Trop.* 1932. Nov.–Dec. Vol. 24. No. 6. pp. 277–319. With 2 figs.

A continuation of the long paper the first part of which was noticed in this *Bulletin* [Vol. 29, p. 801].

Diseases of the New Hebrides :—

Malaria is the most serious disease ; three-fourths of the morbidity is attributable to it. One island only, Futuna, in the south of the group, is free. The species of Anopheles mentioned is *A. punctulatus*. *P. vivax* and *P. falciparum* are found, with a slight predominance of *vivax*.

Amoebic dysentery is only less widely spread than malaria. The author adds, in a footnote, that BUXTON considers this to be probably bacillary because liver abscess is rare, but the author contests this opinion. " Numerous microscopic examinations made by us authorize us to affirm the contrary." Dysentery was little noticed till the introduction of the Indo-Chinese. Placidi thinks it is spread by the manuring habits of the gardeners.

Yaws or *tonga* is widespread, chiefly amongst the Kanakas. Its contagiousness is recognized, for a native refuses to use a path along which a tonga infected native has passed. Sabre tibia is not rare but goundou has not been reported. Intravenous injections cannot be given owing to the aversion of the Kanakas to them. Stovarsol is used in tablet form.

Diseases which are unknown are plague and cholera on the one hand, and diphtheria, scarlet fever, mumps, variola and varicella on the other. Cases have been reported of typhoid and cerebrospinal meningitis but the author thinks it likely, from his own experience, that these were forms of malaria.

Tetanus is frequent and generally fatal for there is no means of preserving antitetanic serum. *Tuberculosis* is common and is disquieting for the future. The conditions in which the Kanakas live are well known. *Blackwater fever* is found in the centre and north of the archipelago, in islands where malaria is hyperendemic. A colleague treated in 2 years more than 200 cases with only 2 deaths and the author has treated 8 cases out of 600 plantation labourers. [It would be interesting to know more of this very mild blackwater.] It is chiefly the Asiatics who suffer.

Ankylostomiasis is very common, the worm being Necator. Examination at Santo showed 320 of 350 persons to be infested. LAMBERT gives similar figures for most of the islands. *Filariasis* is common, but less so in the southern than in the northern isles ; it is nocturnal and due to *W. bancrofti*, and probably transmitted by *S. variegata*. In Santo 23 of 130 labourers were found infected, 17·6 per cent. The usual symptoms are lymphatic varix and adenitis. Only 3 cases of elephantiasis were seen during the author's stay in the group, but it is thought to be commoner than this would indicate.

Beriberi at times causes important losses, rarely amongst the Kanakas who supplement their diet from their gardens ; chiefly among the Chinese and Annamites. Clinically the paralytic form is the most usual (80 per cent.). The author regards it as a toxic infection of intestinal origin, perhaps favoured by a dietary deficient in vitamins.

Leprosy was probably brought from Queensland and New Caledonia by repatriated Kanakas ; it is chiefly found in the southern isles. There seem at present to be few cases. *Syphilis* appears to have extended since the Indo-Chinese introduction : it is much rarer among the Kanakas. *Gonorrhoea* is rare. *Itch* is less common than is usually supposed. *Phagedaenic ulcer* comes second to malaria in causing

incapacity in plantation labourers. *Tinea imbricata* or tokelau is found only in the northern isles and in Banks Is.

The last part of the paper deals with general hygiene in its application to the New Hebrides. The headings are—Recruiting and introduction of labour; Hygienic organization of plantations, with subheads, housing, diets; Disposal of excreta and domestic wastes; Hygiene of infancy; Moral hygiene; Hygiene of clothes; Sanitary service of a plantation—almost a textbook of its subject. *A. G. B.*

STRONG (W. M.). **Nutritional Aspects of Depopulation and Disease in the Western Pacific, especially in Papua.**—*Med. Jl. Australia.* 1932. Oct. 22. Vol. 2. 19th Year. No. 17. pp. 506–512.

The author, who has worked for the last 28 years in Papua, discourses of his experiences of beriberi, scurvy, Vitamin A deficiency, tuberculosis, influenza, and native dietaries. He barely touches on depopulation. *A. G. B.*

LEFROU (G.) & ALLARD. Une décade démographique (1921–1930) à Saint-Louis-du-Sénégal. Natalité, mortalité générale, mortinatalité, mortalité infantile. [**Vital Statistics of S. Louis, Senegal.**]—*Ann. de Méd. et de Pharm. Colon.* 1932. Apr.–May–June. Vol. 30. No. 2. pp. 406–427.

Saint Louis du Senegal is the most ancient African possession of the French. In 1929 its population was 18,147 of whom only 457 were Europeans. The sanitary conditions of the town are extremely bad. The crude birth rate has varied little between 1921 and 1930; it was 57 per 1,000 in the former and 59·6 in the latter year. The crude rate of mortality was 43·3 per 1,000 in 1921 and 35·9 per 1,000 in 1930, but the latter rate followed on one of 57·7 in 1929, in which year plague was epidemic (502 cases with 294 deaths). The still birth rate varied from 67·1 to 57·0 per 1,000 births. Infant mortality varied from 203 per 1,000 live births in 1921 to 166 in 1930; the minimum rate was 117 in 1927–28. The seasonal maximum of mortality is in October. Pulmonary tuberculosis is a frequent cause of death. In 1925 and 1930 several deaths from measles were recorded and the authors suspect infection from Europe. They think the attributions of deaths to malaria are inaccurate. *M. Greenwood.*

DE MARQUEISSAC. Enquête et sondages démographiques en pays Kabré (Nord-Togo). [**Vital Statistics of the Kabré Country.**]—*Bull. Soc. Path. Exot.* 1932. Nov. 9. Vol. 25. No. 9. pp. 986–992.

This is a demographic report on a portion of the Kabré country (northern Togoland), where sleeping sickness is rife. In the area studied the density of population was 90 per square kilometre. The age distribution, shows, in comparison with the English "standard million" (census population of 1901), a great excess of young and defect of old persons. The rate of mortality, unstandardized, was slightly less than 23 per 1,000, the birth rate approximately 50 per 1,000. The still birth rate is not high, it is about 15·5 per 1,000 confinements. The rate of mortality in the first year of life on live born

children is very high, about 307 per 1,000. Of 794 women aged 45 years or more 779 have borne children and had amongst them 5,126 pregnancies, i.e. 6·59 pregnancies per woman. A consideration of the number of survivors to the age of 14 leads to the conclusion that every married woman of 45 leaves 3·5 living children having lost 3 others. *M. Greenwood.*

SOCIEDAD ARGENTINA PATOLOGIA REGIONAL DEL NORTE. Séptima Reunión. . . celebrada en Tucumán los dias 5, 6 y 7 de octubre, 1931. Dedicada a conmemorar el cincuentenario del primer trabajo de Finlay sobre la transmisión de la fiebre amarilla por el mosquito. [**Report of Seventh Congress of Northern Argentine Pathological Society.**]—pp. xviii + 526. With numerous illustrations. 1932. Buenos Aires: Imprenta de la Universidad.

This volume of reprints of papers read at the Seventh Congress of the Northern Argentine Pathological Society, held at Tucumán at the beginning of October, 1931, comprises 43 articles arranged under three main heads. Part I consists of 24 papers dealing with experimental and clinical medicine, preceded by a brief but interesting narration by Professor W. H. HOFFMANN of the chief features of the life and work of Charles FINLAY. This section deals with a variety of subjects including tuberculosis, goitre, undulant fever, climatic bubo, poisoning by snakes and spiders. Others of sufficient importance to be reviewed separately in the *Tropical Diseases Bulletin* or *Bulletin of Hygiene* are: attempts at cultivating *Myco. leprae*; the prevalence of scarlet fever in Jujuy; and undulant fever in Santiago del Estero.

Part II, 17 papers, is concerned with Mycology, clinical cases of various forms being recorded—blastomycosis, moniliasis, aspergillosis, actinomycosis and mycetoma.

Part III contains a single article on the treatment of American leishmaniasis by Fouadin; this is contributed by Doctor Salvador MAZZA, President of the Society.

The work as a whole is well illustrated with coloured plates, and microphotographs well reproduced. *H. H. S.*

SHILLONG. **King Edward VII Memorial Pasteur Institute and Medical Research Institute. The Fifteenth Annual Report for the Year ending 31st December 1931** [MORISON (J.), Director].—46 pp. 1932. Shillong. [3s. 6d.; Rs. 2. As. 6.]

In addition to tables of data regarding the routine work of the laboratory some interesting observations are made with regard to bacteriophage and its preparation for cholera and dysentery. Fresh phages are obtained with certainty week by week and fresh bacteria are also procured. At the time of writing 64 different combinations of bacteria and phage were being employed in each brew. The subject of change in the character of the vibrio under the action of bacteriophage is just referred to. "Vibrios isolated from cases of cholera are usually smooth," but batches were found towards the end of a Calcutta epidemic which were mostly rough and resistant to type A phage. "Such a rough 'A' resistant vibrio if made resistant to 'B' or 'C' types of phage was apparently changed to a smooth strain."

An important field experiment in the use of cholera phage progresses favourably: "In Nowgong the phage was placed in the hands of the village headmen. . . . with instructions to give the phage to every case of diarrhoea, dysentery and suspected cholera. Habiganj was kept as a control. Up to the time of writing five successive epidemic seasons have passed without an outbreak in Nowgong, while in the control area there has been an outbreak each season. . . . The experiment has now been extended to Habiganj and cholera vaccination has ceased in both areas."

A considerable section of the report deals with malaria operations. In many places evidently anti-larval measures are impracticable and in such places the only practical proposition seems to be treatment.

W. F. Harvey.

HARVEY (W. F.) & HAMILTON (T. D.). **Studies on Blood and Tissue Reactions.**—*Edinburgh Med. Jl.* 1932. May, June & July. Vol. 39. Nos. 5, 6 & 7. pp. 285–310; 349–367; 439–447. With 5 figs. [87 refs.]

In this paper the authors describe the technique they have adopted for the study of the cells of the blood. They appear to have taken nothing for granted and have tested every procedure for themselves, even such simple ones as the pricking of the finger for obtaining blood and the cleaning of the slides. They point out many sources of error which, though apparently trivial, will, if neglected, lead to imperfect preparations and incorrect interpretations. Having established for themselves a standard technique they proceed to the differential blood-cell count and test such points as the distribution of leucocytes in different parts of the film and their variations in blood drawn from different parts of the body and at different times of the day in relation to food, sleep and other factors. The general conclusion is that there is not a very large error in making a single leucocyte total count provided the necessary precautions are taken, while the differential cell-count on a well-made, and to a surprising extent on an ill-made film is significantly valid for diagnostic purposes. There is evidence of long-wave diurnal oscillation of leucocyte numbers and proportions, but not sufficient evidence of a superimposed periodic short-wave type of fluctuation. All sorts of factors, such as sleep, posture, heat and cold, muscular exercise, locality of examination, digestion and simple ingestion, may be regarded as traumata and may produce leucocytic variation of greater or less duration and may combine together to enhance or to mask the variation due to any one factor singly.

C. M. Wenyon.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE. 1932. Sept. Vol. 25. No. 11. pp. 1703–1728 (Sect. Trop. Dis. & Parasit. & Sect. of Med. pp. 111–136). With 12 charts & 2 figs. [Numerous refs.]—**Discussion on the Megalocytic Anaemias of Tropical and Non-Tropical Countries** [WITTS (L. J.); FAIRLEY (N. Hamilton); GOODHART (Gordon); WILLS (Lucy); STEWART (M. J.); LIGHTWOOD (Reginald); VAUGHAN (Janet)].

Dr. L. J. Witts pointed out that the terms "pernicious anaemia" and "megalocytic anaemia" were by no means synonymous. The

frequency distribution curve constructed by PRICE-JONES embraced all the possible variations in diameter of healthy erythrocytes; cells which fell to the right of the normal curve were megalocytes and a megalocytic anaemia was one in which such cells were present. The curve of the distribution of red cell diameters gave much more information than the mean diameter of the cells, for megalocytes were always pathological whatever the diameter, and their appearance in the peripheral blood connoted proliferation of megaloblasts in the bone marrow which was liable to occur under two sets of circumstances. Firstly, in the anhaemopoietic anaemias like pernicious anaemia, vitamin B deficiency and certain intestinal anaemias, or in the fatty diarrhoeas such as occur in sprue, coeliac disease, chylous and pancreatic diarrhoea and gastro-colic fistula, the nutrition of the blood-forming organs is disturbed with the production of megaloblastic degeneration of the bone marrow and a decreased formation of blood: such types accounted for 90 per cent. of the megalocytic anaemias met with in England. Secondly, there were acute and chronic haemolytic anaemias such as occur in leukaemia, lymphadenoma and splenic anaemia when blood formation was greatly accelerated with hyperplasia of megaloblastic tissue and increased blood destruction. These anaemias were usually, but by no means always, of megalocytic type: the degree of anisocytosis was rarely high and the whole curve of distribution of the red cell diameters presented the appearance of being shifted bodily to the right; this suggested that they were due to a morbid haemolysis rather than to any primary distribution of the bone marrow itself.

Dr. Gordon Goodhart recorded a short series of cases of non-tropical megalocytic anaemia with high color-index which could not be classified as pernicious anaemia, pointing out that although the title of his contribution was "chronic haemolytic anaemia" he regarded most of them as aplastic rather than haemolytic in origin. They possessed certain features in common: all had grave anaemia with a high color-index, all had a very definite megalocytosis, and all failed to respond to liver extract administered by the mouth. Two other features were noticeable. The Price-Jones curve, although shifted well to the right, did not show the marked asymmetry characteristic of pernicious anaemia and in some cases it was as symmetrical as the normal curve. Secondly, there was an absence of the large, characteristic polymorphonuclear cells with hypersegmentation of the nuclei that are constantly seen in pernicious anaemia; all except one case showed a leucopenia of lymphoid type and in several there was a definite shift to the left in the Arneth count.

Dr. N. Hamilton Fairley stated that the only tropical haemolytic anaemia of megalocytic type occurred in Oroya fever, which was due to *Bartonella bacilliformis* located in the red corpuscles. The Bartonella anaemias were of great interest owing to the rapidity with which megaloblastic hypertrophy of the bone marrow ensued. The other haemolytic anaemias, such as malaria, invariably induced an erythroblastic response associated with an anaemia of normocytic or secondary type. Megalocytic anaemias of nutritional and alimentary origin were of more importance in the tropics, the bone marrow generally responding to the administration of adequate quantities of liver extract or marmite with reticulocytosis and rapid blood regeneration. Particular attention was directed to the differentiation of tropical sprue and pernicious anaemia, the duality of the two diseases still

being denied by some ; in severe cases the anaemias were often very similar in type. The predominance of gastro-intestinal symptoms with fatty, gaseous diarrhoea especially in the morning, the marked loss of weight, the absence of both neurological features and of the lemon tinting of the skin in sprue were important points in diagnosis, while at autopsy the lack of yellow subcutaneous fat, the small heart, the atrophied intestine and the appearance of the bone marrow enabled sprue to be recognized. Some 70 per cent. of sprue cases secreted acid after a histamine test meal. Typically the total faecal fat was increased in amount though adequately split and the glucose tolerance curve was flattened, findings which indicated defective absorption of fat and glucose respectively. The bilirubin content of the blood, though slightly increased in sprue, rarely exceeded 2·0 van den Bergh units. Sometimes achylia gastrica persisted after all intestinal symptoms of sprue had disappeared and true pernicious anaemia occasionally eventuated under these circumstances.

Dr. Lucy Wills dealt with the subject of tropical macrocytic anaemia which was especially common in pregnant women in Southern India, China and West Africa : it was quite distinct from the so-called " pernicious anaemia of pregnancy." The disease was seasonal, in India occurring between October and April, and it affected all communities and grades of society. In most patients rice formed an important part of the diet. Patients were often admitted to hospital in the 7th and 8th month and premature labour followed with either rapid improvement or collapse and death. In non-pregnant patients the disease was far more chronic. The symptoms, other than those referable to the anaemia, were very variable ; and included sore tongue and mouth and splenomegaly. Fever, vomiting and diarrhoea were sometimes marked features, but these were probably related to the incidence of diarrhoea in the general population. The anaemia was severe, 32 out of 54 cases having initial red cell counts below a million. The death rate before the discovery of liver extract was high (42 per cent. in BALFOUR's series) and fell only to 33 per cent. in a subsequent series treated with liver extract owing to patients being so frequently moribund on admission. Later, after the speaker had discovered the value of marmite (yeast extract), the death rate fell considerably. The blood picture was macrocytic, normoblasts and megaloblasts were present, and the Price Jones curve showed a shift to the right and a marked increase in variability. Poikilocytosis was not marked, nor was the serum bilirubin increased. Normal acidity was the rule while the white cell count was variable in pregnant cases : leucopenia was common in the non-pregnant. The serum calcium was normal, but the non-protein nitrogen and urea in the blood were moderately increased in severe anaemia. Large doses of liver extract or a teaspoonful of marmite 3 or 4 times daily was followed by rapid improvement with a maximal reticulocytosis on the 5th day. The anaemia was probably of nutritional origin and the curative action of these remedies appeared to be due to some part of the vitamin B complex other than B1.

Dr. Price Jones said that the common feature of every sample of blood-cells in health and disease is " anisocytosis " or inequality of size. The chief use of " distribution curves " was to express this anisocytosis, or the variability of the diameter of the cells. From the distribution the mean diameter was calculated and the position of the curve and mean diameter was shown in relation to the normal

curve and mean diameter which he had derived from the measurement of 50,000 healthy red cells. This position enabled us to say if the distribution was megalocytic, microcytic, or both, or neither. By enumerating the cells distributed outside the limits of the normal distribution, it was possible to estimate the degree of megalocytosis or microcytosis as the case may be. The curve also showed if the distribution is symmetrical or skew. In anaemia there was no correlation between the mean diameter and the degree of anaemia. There was, however, a direct correlation of the anisocytosis or variability and the severity of the anaemia. He suggested that in conditions associated with marrow dysfunction the curve was shifted to right or left and the distribution had high variability and was more or less asymmetrical or skew. In those conditions in which the cells were acted on by some common factor in the circulation, and only indirectly or secondarily associated with disordered haemopoiesis, the variability was more frequently normal or relatively slight, and the distribution was more or less symmetrical.

Dr. Janet Vaughan said that in investigating a series of thirteen cases of coeliac disease or idiopathic steatorrhea in adults, she had found two with a megalocytic hyperchromic anaemia. In view of the observations of Dr. Lucy Wills on the treatment of tropical anaemia, both patients had been given large daily doses of marmite. In both there had been prompt improvement, the reticulocytes reaching the maximum level calculated from the initial red-cell count. The return to a normal blood-picture had been associated with a notable gain in weight, as in Addisonian pernicious anaemia. Other symptoms, e.g., diarrhoea and tetany, had been unaffected. She presumed, therefore, that marmite exerted a direct effect upon disordered haemopoiesis. *N. Hamilton Fairley.*

GUPTA (N.). **The Anaemia of Pregnancy.**—*Indian Med. Gaz.* 1932. Aug. Vol. 67. No. 8. pp. 421–432. With 5 graphs & 9 figs. (2 coloured) on 3 plates. [24 refs.]

This anaemia occurs in Bengal as a distinct disease associated with pregnancy. The extent to which ankylostomiasis, malaria, sprue and other diseases are involved in the aetiology of pregnancy anaemia is questionable.

It is a disease as distinct in its entity as pernicious anaemia of the Addisonian type. The fully-developed clinical picture leaves a distinct impression on the mind of the observer. The face is usually pale, the conjunctivae white, but the patient is much less emaciated than would be naturally expected. The tongue is glossy and flabby; soreness may be noted, but is not customary. Diarrhoea is commonly complained of. A small degree of pyrexia is usual. The disease occurs in all communities in Bengal, in town and country, whilst Anglo-Indians and Jews suffer less in proportion and severity; the pure Europeans are practically unaffected.

The present study is based on 203 cases all admitted at, or nearly at, full term. The few complications consisted of malaria (2), ankylostomiasis (2), amoebic dysentery (1) and syphilis (15). The cases in the series can be tabulated into three groups: (1) Red cell count one million or less, 36 cases. (2) Red cell count between one and two millions, 114 cases. (3) Red cell count between two and three

millions, 53 cases. The mean average red cell count was 1,530,000, the average colour index 1·1 and the leucocyte count 7,485 per cmm.

These figures are compared with the blood condition of pregnant Bengali women of the hospital class in 55 cases. The blood picture worked out at three millions per cmm., the percentage of haemoglobin 55 per cent. and the colour index 0·9.

In the microscopic blood picture the most striking feature is the marked decrease in the red cells. Basophilia was noted in 20 per cent. of the cases, anisocytosis and poikilocytosis in 74·3, normoblasts or pronormoblasts in 25, and true megaloblasts in 0·4 per cent. All these features indicate an active regeneration of the bone marrow.

The response to liver dietary is not like that of true pernicious anaemia. Unlike pernicious anaemia there is a more or less normal leucocyte count of 7,430 per cmm. In the differential count neutrophiles number 70 per cent. The urine showed no distinctive features, whilst *B. welchii* was present in the faeces in two cases.

The Hindu community produces the greatest number of cases, 57·9 per cent., the Mohammedans 10·24 per cent., Indian Christians 25·5 per cent., Anglo-Indians 3·13 per cent. and Jews 1·23 per cent. The highest frequency of anaemia of pregnancy is between the ages of 15 and 20 years with a steady decline after 25 years. Primiparous women are most affected, but there is a sudden rise in the 8th or 9th gravidas. From a pathological viewpoint the most striking feature is the deposit of free iron in the internal organs. The spleen is enlarged and shows histologically myeloid hyperplasia and haematopoïetic changes, the cells of the reticulo-endothelial system are proliferated.

The syndrome complex of pregnancy anaemia is rarely seen in any other condition except pregnancy amongst the general population of Bengal.

No support has been adduced in favour of KNOTT's hypothesis that this anaemia is associated with haemolytic strains of streptococci or *Bact. coli*; on the other hand most of the patients have suffered from some form of anaemia-producing tropical disease at some period of their lives and the effect upon the blood-forming organs is by no means negligible.

Treatment consists in paying detailed attention to the dietary, especially during the first trimester, whilst any septic focus should be removed. Liver and vitamin treatment have a better result in the first half of pregnancy, whilst exerting little effect in the 3rd trimester. Intramuscular injections of blood (20 cc.) on alternate days may improve the blood during the first half of pregnancy.

(The Editorial in this number of the *Indian Medical Gazette* summarizes the present knowledge of the anaemia in a detailed manner. The designation "*Tropical anaemia of Pregnancy*" is preferred to ambiguous titles. It has been suggested by MACKIE (1929) that there is a peculiarly fatal type of anaemia, an anaemia *sui generis*, which is not confined to pregnant women or to sprue patients. He considers it an aplastic anaemia and to be distinguished clinically and haematologically from Addison's disease. BARDY in 1924, published notes on 68 cases collected from the medical literature of Europe and the United States over a period of 38 years which gives an incidence of 1 per 10,000. In India the figures are totally different and in the statistics collected so far show an incidence of 29·3 per 1,000 or about 300 times the figure for Europe.) *P. Manson-Bahr.*

BONNE (C.). Eenige weinig bekende feiten van klinische beteekenis omtrent het primaire levercarcinoom. [**Some Little Known Facts concerning Liver Carcinoma of Clinical Significance**].—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1932. Vol. 72. No. 7. pp. 389–392.

The frequency of primary liver carcinoma in tropical lands as compared with the temperate zone entitles it to be called a tropical disease. In typical cases the liver is greatly enlarged and painful and the numerous metastases are localized to the liver itself. Liver function may be little disturbed up to shortly before death, which may take place with symptoms of acute hepatic insufficiency. This retention of function is explainable by the fact that the tumour is essentially a liver cell tumour, with maintenance of considerable resemblance to the cells of origin. Ingrowth of tumour into portal vessels is one of the characters of the tumour and may even bring about total thrombosis in the portal tract. Cirrhosis is almost invariably associated with primary liver carcinoma and as cirrhosis can bring about diminution in size of the liver, so it is found that the carcinoma may sometimes develop in a small liver. Difficulty may sometimes be found in differentiating between liver abscess and carcinoma. It may even be difficult to make out from the necrotic material of puncture which of the two conditions is present. If distant metastasis does take place it is usually to the lung but it may be to bone and a spontaneous fracture may be the first symptom to attract notice. *W. F. Harvey.*

i. THONNARD-NEUMANN (E.). **Treatment with Di-Hydranol of Intestinal Protozoal and Helminthic Infections in Man. A Preliminary Report.**—*Twentieth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1931. pp. 122–126.

ii. MACKIE (Thomas T.). **Di-Hydranol in the Treatment of Intestinal Protozoal Infections.**—*Ibid.* pp. 126–131.

i. The summary gives a full account. The work was done in Colombia.

"Di-hydranol, a resorcinol derivative, was employed in the treatment of 105 individual intestinal infections encountered in 31 male adults. It was administered in a solution of olive oil in gelatin capsules.

"Uncinaria (23 cases) and Trichuris trichiura (22 cases) generally proved refractory to the drug, whereas 4 cases of ascariasis showed a good response.

"Di-hydranol proved itself of decided value in the treatment of 28 carriers of E. histolytica. Three-fourths of the infected cases became negative under treatment. Five of the seven cases which showed unsatisfactory results were very heavily infected, though none of them showed any acute dysenteric symptoms. The clinical response in three cases with acute dysenteric symptoms was very satisfactory. Thirty-two per cent. of the cases developed cysts during the treatment; and the effect of the drug upon these was poor, as 6 out of 9 remained positive. [It is stated—"It is extremely difficult to follow the cases for observation."]

"Very encouraging immediate results were obtained in Giardia lamblia infections—in 14 of the 21 cases the stools became negative. Of the 19 instances in which patients showed co-existing infections with Endamoeba and Lamblia we succeeded in freeing the carriers from both infections in eight instances.

"The 7 cases of infection with Strongyloides yielded, without exception, to Di-hydranol."

The results obtained in Strongyloides infection were far superior, the author says, to those obtained with any drug hitherto employed by him.

ii. Mackie, whose trials were made in Guatemala, says that the standard dose for adults was 4 pills of 0·15 gm. each three times daily after meals for eight consecutive days, and that no toxic effects were noticed.

Here again a proper follow-up was impossible. His conclusions are not so favourable as those of NEUMANN.

"1. Di-hydranol in doses up to 20 grams in 9 days for adults, and in proportion for children, was well borne and not associated with the development of toxic symptoms.

"2. Its effectiveness against Giardia lamblia appears to vary directly with the dosage since only the larger amounts resulted in apparent cure.

"3. When given to children in proportion to age, the total amount appears to be insufficient for therapeutic purposes.

"4. Di-hydranol has little or no effect on other intestinal protozoa with the possible exception of Iodamoeba butschlii which seems to be susceptible to its action."

A number of tables is given in each paper. *A. G. B.*

MALARET (P. S.). **Antityphoid Vaccination.**—*Twentieth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass. 1931.* pp. 165–170. [Summary appears also in *Bulletin of Hygiene.*]

In a civil population in Cuba it has not been found practicable to administer prophylactic vaccination against typhoid fever in the ordinary manner by a course of three injections. Following the practice developed in the Argentine Army of giving a single inoculation of high concentration the Cuban Army authorities have taken up the method and report even better results than when the three-dose method was carried out. In view of these results the method has now also been applied to the Cuban civilian population but the dose of the vaccine was halved so that 2,500 millions of killed bacilli are injected, suitable decreases being made for younger subjects. The reactions following this single injection with larger dosage do not appear to be more severe than those following the three injections, and the results of agglutination tests before and after inoculation point definitely to the production of antibodies. During 1931, 8,120 single high dose injections have been given and in the same year of 42 cases of typhoid fever admitted to hospital two had previously received single dose inoculations. *A. Joe.*

ROY (J. N.). A propos de l'étiologie du goundou. [**Etiology of Goundou.**]—*Rev. Méd. et Hyg. Trop.* 1932. July–Aug. Vol. 24. No. 4. pp. 169–175.

In this article Roy reprints several pages of a previous publication in order to reiterate his belief that goundou is not caused by yaws any more than it is by syphilis. For him the etiology remains unknown. *H. S. Stannus.*

CAWSTON (F. G.). The Principles of Early Treatment of Tropical Disease, with Special Reference to Malaria in Natal.—*Jl. Trop. Med. & Hyg.* 1932. Dec. 15. Vol. 35. No. 24. pp. 371–372.

GOETTE. Reisebrief ueber die Ausbildungsreise des Schulkreuzers "Emden" nach Ostasien, Südsee und Afrika vom 1. Dez. 1930 bis 8. Dez. 1931.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Dec. Vol. 36. No. 12. pp. 637–650.

LEE (H. B.). Some Notes on Hospital Management in Nigeria.—*West African Med. Jl.* 1932. Oct. Vol. 6. No. 2. pp. 22–25. An excellent article which cannot be summarized.

MACVICAR (N.). The Prevalence of Certain Diseases among the Natives of the Ciskei.—*South African Med. Jl.* 1932. Nov. 26. Vol. 6. No. 22. pp. 721–724. With 1 chart.

RAMALI (A.). Een geval van tropica-"appendicitis."—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1932. Nov. 8. Vol. 72. No. 23. pp. 1611–1612.

SERGENT (Edmond). Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1931.—*Arch. Inst. Pasteur d'Algérie.* 1932. Mar. Vol. 10. No. 1. pp. 119–151. [52 refs.]

REVIEWS AND NOTICES.

GARIN (Ch.) [Professeur agrégé à la Faculté, Médecin des Hôpitaux de Lyon], ROUSSET (J.) [Ex-Interne des Hôpitaux de Lyon, Chef de clinique à la Faculté] & GONTHIER (B.) [Médecin-chef de la Cie des Mines de Roche-la-Molière et Firminy]. **L'ankylostomose.** [Ankylostomiasis.]—128 pp. With 56 figs. 1932. Paris-6: Masson et Cie, 120 Boulevard Saint-Germain. [36 fr.]

It appears that the intention of this monograph is to aid in attacking hookworm infection in mines. Its statements should be accepted with caution, and proof reading has not been close enough to detect obvious errors. The morphological section contains a number of mistakes, makes no mention of *Ancylostoma braziliense*, and in spite of Opinion 66 rendered by the International Commission on Zoological Nomenclature of 1915 continues to call the genus *Ankylostoma*. As the result of longitudinal sections of worms it is confirmed that blood and iron-containing yellow pigment are present in the intestinal contents. The author's estimate of the daily rate of oviposition is 2,600 eggs by each female, independent apparently of species. The various tropisms of infective larvae are accepted. Ground itch is so rare in the authors' experience that they range themselves with those who conclude that, in its marked form at least, it is due to bacterial contamination. In treatment they have used thymol and tertrachlorethylene and prefer the latter (this *Bulletin*, v. 29, p. 756); and they use for detection of eggs the method described in the same paper. This section of the book contains many microphotographs of eggs and larvae of other parasites and of some free-living nematodes found in mines. The difficulty of disposal of faeces and of disinfecting a mine are pointed out; and for prophylaxis the main stress is laid on treatment, beginning with those persons most heavily infected. *Clayton Lane.*

CHOPRA (R. N.) [M.A., M.D. (Cantab.), Lt.-Col. I.M.S., etc.]. **Indigenous Drugs of India. Their Medical and Economic Aspects.**—pp. xxii + 655. 1933. Calcutta: The Art Press, 20 British Indian Street. [Rs. 15/–].

Empirical investigation of the indigenous drugs of India began many centuries ago, but scientific investigation had to await the development of chemistry and physiology. Even after those sciences were well advanced the co-ordination of pharmacological analyses and physiological reactions with clinical results was hampered for many years by the absence in India of well-equipped laboratories and research hospitals in close association. This handicap has of late years been to a considerable extent lightened. The author of the present work, as Professor of Pharmacology in the Calcutta School of Tropical Medicine and as a Physician to the Carmichael Hospital for Tropical Diseases, has both laboratories and clinical material at his disposal and has made good use of his opportunities.

The present work is an expansion of a course of lectures delivered by Lieut.-Col. Chopra as Sukhraj Ray Reader in Natural Science at Patna University during 1929–30. The term "Indigenous" is not used *sensu stricto*, but includes a certain number of drugs derived from plants, such as Cinchona, Ipecacuanha and Hemp which it would be absurd to exclude from consideration merely because they are introductions into India.

The book is divided into five sections. The first discusses in interesting and informative fashion such topics as the history of Indian Materia Medica, the need for research in indigenous drugs, India's foreign trade in drugs, the cultivation of medicinal plants in India, the manufacture of standardized preparations from crude drugs produced in India, the use of crude drugs in certain cases in order to lower the cost of treatment and the adulteration of drugs which is so prevalent in India.

The second part is concerned with the actual and potential resources of India for the production of drugs recognized by official Pharmacopoeias.

Two species of blister-beetles and over eighty species of plants are mentioned as occurring in India, although a few of these, such as *Erythroxylum Coca* (the source of Cocaine) and the various species of *Strophanthus*, have but slender credentials for admission. In this section the author refrains from overburdening his pages with botanical, chemical, pharmacological and therapeutic details, which, as he states, can be found in any of the standard works. Special attention is given on the other hand to the economic aspects of the production of such pharmacopoeial drugs in India, and as an instance of this, the author's well-balanced discussion of the problem of quinine production in India may be mentioned.

Part III deals with a selection from the vast number of drugs used by the practitioners of the indigenous systems of medicine. The chemistry, pharmacology and therapeutic uses of the drugs derived from over fifty indigenous plants and a few of non-vegetable origin are described.

Part IV gives an alphabetical list of the botanical names of Indian medicinal plants, an amazing multitude of over 2,000 species, with their Natural Families, more common Indian names and uses with references to literature. Similar but less-detailed lists follow of inorganic and animal products, of plants used in snake bite and scorpion sting—which remedies the author dismisses as useless.

Part V consists of a list of the common bazaar medicines of India, mostly derived from plants, arranged alphabetically under the scientific names of the plants. Under each are given the vernacular names and notes regarding the plant, its distribution, uses and parts used. This is followed by an index of common vernacular names and a general index to the volume.

A considerable amount of original pharmacological work and clinical observations is embodied in the work and, taking it as a whole, it may be pronounced the best book in a moderate compass on the subject that has yet appeared. It is well printed and well produced. *A. T. Gage.*

THOMPSON (C. J. S.) [M.B.E., etc.]. **A Compendium of the Pharmacopoeias and Formularies (Official and Unofficial) with Practical Aids to Prescribing and Dispensing.** 7th Edition.—pp. ix+381. 1933. London: John Bale, Sons & Danielsson, Ltd., 83–91 Great Titchfield Street, W.1. [10s. 6d.]

The fact that this work has reached a seventh edition is clear evidence of its usefulness. Though handy in size—it can easily fit into the pocket—it contains a vast amount of information. A list of modern remedies, both official and non-official, is given with brief notes of dosage and use, and synopses of the recent British Pharmacopoeia and those of the United States, continental and other foreign countries. Many helpful prescriptions and formulae for medical purposes are to be found and even those of toilet preparations. Other sections deal with modes of preparing the invalid foods in common use, the methods of milk analysis and detection of preservatives, incompatibility, poisons and their antidotes. There are various tables of weights, measures, temperatures and their equivalents, obstetric calculation, posological index and a list of the Latin terms found in prescriptions, with their meanings and the equivalent phrases in French, German, Italian, Spanish and Dutch. In the reviewer's opinion undue prominence would seem to be given to the Latin terms, in fact some of the concords so called would bring trouble to Smith minor; moreover, many if not most of the terms mentioned are rarely if ever used in Latin, now that the public are less ready to be mystified than they were fifty years ago. How many practitioners of the present day would know, or bother to remember, the English equivalents of Lagena obturata, Quant. fab., Quant. nuc. jugl., or Scrob. cord.? These conundrums, however, occupy less than ten pages, and the book as a whole is admirable, and after testing

it in the usual way by looking first for the commoner things and later for more out-of-the-way matters, we have so far not found it wanting and therefore heartily recommend it not only for the home practitioner but also for those abroad, district medical officers for example to whom such a work would frequently offer a helpful suggestion. *H. H. S.*

JOHANNESSOHN (Fritz) [Dr. Med.]. **Chinin in der Allgemeinpraxis unter Berücksichtigung pharmakologischer Befunde. Ein Nachtrag zu der 1930 Erschienenen Ausgabe.** [Quinine in General Practice with Special Reference to Pharmacological Findings. An Appendix.]—176 pp. 1932. Amsterdam–W. Bureau tot Bevordering van het Kinine-Gebruik.

In 1930 the author published a work in which the use of quinine chiefly in conditions other than malaria was reviewed. In this appendix some 400 further publications are considered. It deals with the history of cinchona bark and quinine, the chemistry of quinine, its distribution in the body and excretion and (pp. 32–108) its therapeutic application in a great variety of conditions but not malaria; in shorter sections are considered diagnosis, toxic effects, dosage and quinidine. The book is well indexed, and appears to be a useful compilation. *A. G. B.*

SOCIÉTÉ DES NATIONS. ORGANISATION D'HYGIÈNE. **Paludisme dans les Deltas. Delta de l'Ebre** [PITTALUGA et al.]. **Delta du Danube** [ZOTTA (G.)]. [Malaria in the Deltas of the Ebro and Danube.] —176 pp. With illustrations. 1932. Sept. Genève. [C. H. Malaria/179].

This work bearing the superscription of the League of Nations was published in the *Archives Roumaines Pathologie Expérimentale et Microbiologie*. It was noticed in this *Bulletin* in February (No. 2. pp. 62–3).

A. G. B.

We record with great regret the death of Lt.-Colonel A. W. ALCOCK, F.R.S. Colonel ALCOCK became Sectional Editor in 1919 and Assistant Director (half-time) in 1921. In 1925, when a whole-time Assistant Director was required, Colonel ALCOCK continued his work as Sectional Editor till he resigned on grounds of health in November, 1932. He will be sadly missed by the discerning reader of this *Bulletin*. Of him it may be truly said: Nihil quod tetigit non ornavit.

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